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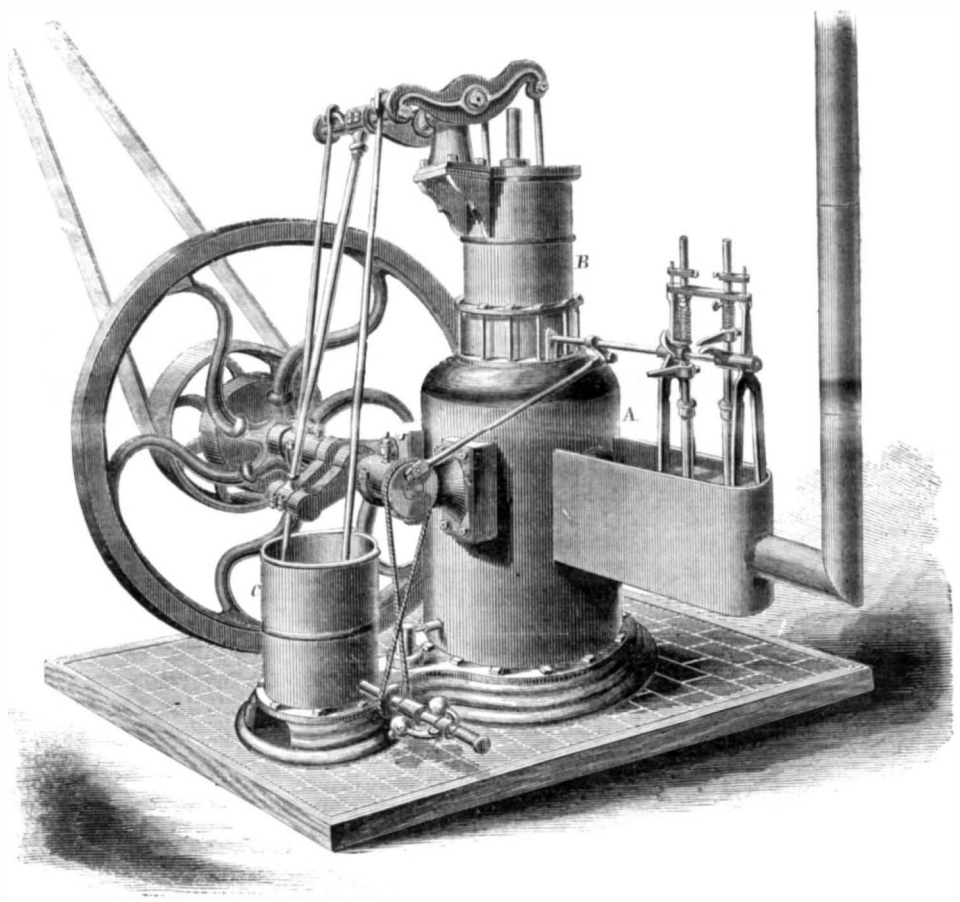
Improved Air Engine.

On page 97, Vol. VIII, we gave an illustration of Roper's air engine, the first engine, we believe, either air or steam, which has proved practically successful in using the products of combustion to increase the pressure in the cylinder. This achievement will permanently give to this invention a prominent place in the history of prime movers, as being one of the great steps in the progress of that foundation department of mechanics. The great interest which attaches to this invention, and the fact that it has gone into practical use on a large scale, induces us to present to our readers another illustration of it, embracing some improvements which have been added since the first one appeared.



ROPER'S AIR ENGINE.

The engine is exceedingly simple. It may be regarded as a steam engine worked by air, with the furnace inside of the boiler.

Referring to the engraving, the large upright cylinder, A, is the chamber in which the air is heated, the fire being inside in direct contact with the air. The door through which the coal is introduced is on the opposite side of the air chamber, and is not shown in the cut. This door closes air-tight and is secured to withstand the pressure at which the air is worked.

As the air is expanded by heat it is let into the bottom of the working cylinder, B, through a valve opening, at the proper time, and forces up the piston, thus vibrating the beam at the top of the cylinder, and turning the wheel through the connections shown.

The two rods on the outer end of the beam operate the piston of the air-pump, C, by which the air is compressed and forced into the heating chamber, A. The air enters the heating chamber through two pipes, one above the grate and one below; the larger portion of the air entering above the grate. This arrangement prevents a blast through the fire that would carry ashes and bits of unburned coal into the cylinder.

The general plan of this engine has been described by Professor Rankin and by Fairbairn as "Joule's engine of constant pressure;" but without Roper's device of placing the fire in the heating chamber, it would probably never have come into general use as an economical and practical motor. This arrangement not only utilizes the pressure of the hot gases generated by the combustion of the fuel, but it has another advantage of far greater importance. One of the most serious difficulties in air engines has been the extreme slowness with which heat can be imparted to air through iron plates. When air is passed directly through the fire the oxygen that enters into combination with the carbon and hydrogen of the fuel, is, by the act of combination, heated to a temperature of some 3,000 degrees. Then these white-hot gases are mingled with the cool air entering above the fire, and their temperature is brought down to the point at which they can be worked through the cylinder without destroying the packing. As the quantity introduced above and below the coal may be varied by a stop-cock upon the outside, the temperature of the working air can be adjusted with the nicest precision.

A sufficient quantity of coal is introduced in the morning to last till noon, so the engine does not require to be stopped for feed any oftener than the men must stop for the same purpose. The rapidity of the combustion is controlled perfectly by the quantity of air admitted below the grate.

Economy of air engines is claimed only in cases where small powers are required—from one to four horses—and in these cases the great saving is in dispensing with the services of an engineer. It is also claimed that two years experience has shown this engine to be less costly in interruptions and repairs than ordinary steam engines

For further information in relation to this engine address Crosby, Butterfield & Haven, 47 Pearl street, Boston, or 22 Dey street, New York, where machines can be seen in operation. More than 200 of these engines are now in use, and not one, we are told, has ever been condemned.

A MAN in Bridgeport sent a box to his son in New Orleans, and enclosed a screw-driver that he might withdraw the screws with which it was fastened.

Preservation of the Teeth.

Horace Walpole says ("Letters," vol. iii. p. 276): "Use a little bit of alum twice or thrice in a week, no bigger than half your nail, till it has all dissolved in your mouth, and then spit it out. This has fortified my teeth, that they are as strong as the pen of Junius. I learned it of Mrs. Grosvenor, who had not a speck in her teeth till her death." Do not let your brushes be too hard, as they are likely to irritate the gums and injure the enamel. Avoid too frequent use of tooth powder, and be very cautious what kind you buy, as many are prepared with destructive acids. Those who brush their teeth carefully and thoroughly with tepid water and a soft brush (cold water should never be used, for it chills and injures the nerves) have no occasion to use powder. Should any little incrustation (tartar) appear on the sides or at the back of the teeth, which illness and very often the constant eating of sweetmeats, fruit, and made dishes containing acids will cause, put a little magnesia on your brush, and after two or three applications it will remove it. While treating on the care of the teeth, which is a subject of the highest importance to those who have young families, and in fact every one who wishes to preserve them, I beg to remind my readers that as the period generally occupied by sleep is calculated to be about (at least) six hours out of the twenty-four, it would greatly promote the healthful maintenance of the priceless pearls whose loss or decay so greatly influences our appearance and our comfort, if we were to establish a habit of carefully cleaning them with a soft brush before going to bed. The small particles of food clogging the gums impede circulation, generate tartar and caries, and affect the breath. Think of an amalgamation of cheese, flesh, sweetmeats, fruit, etc., in a state of decomposition, remaining wedged between our teeth for six or seven hours; yet how few ever take the trouble to attend to this most certain cause of toothache, discoloration, and decay, entailing the miseries of scaling, plugging, extraction, and the crowning horror —false teeth!—*Gody's Lady's Book.*

AT the beginning of the war the Government took the hides from dead army horses and buried their flayed bodies at Rall's Cross Roads and elsewhere, at a cost of fifty thousand dollars a year. Now it receives from a firm in Alexandria, Va., fifty thousand dollars per annum for permission to take dead animals off its hand.

MR. George W. Brochett has established a sorghum sirup manufactory in North Haven, capable of making 100 gallons every twenty-four hours.

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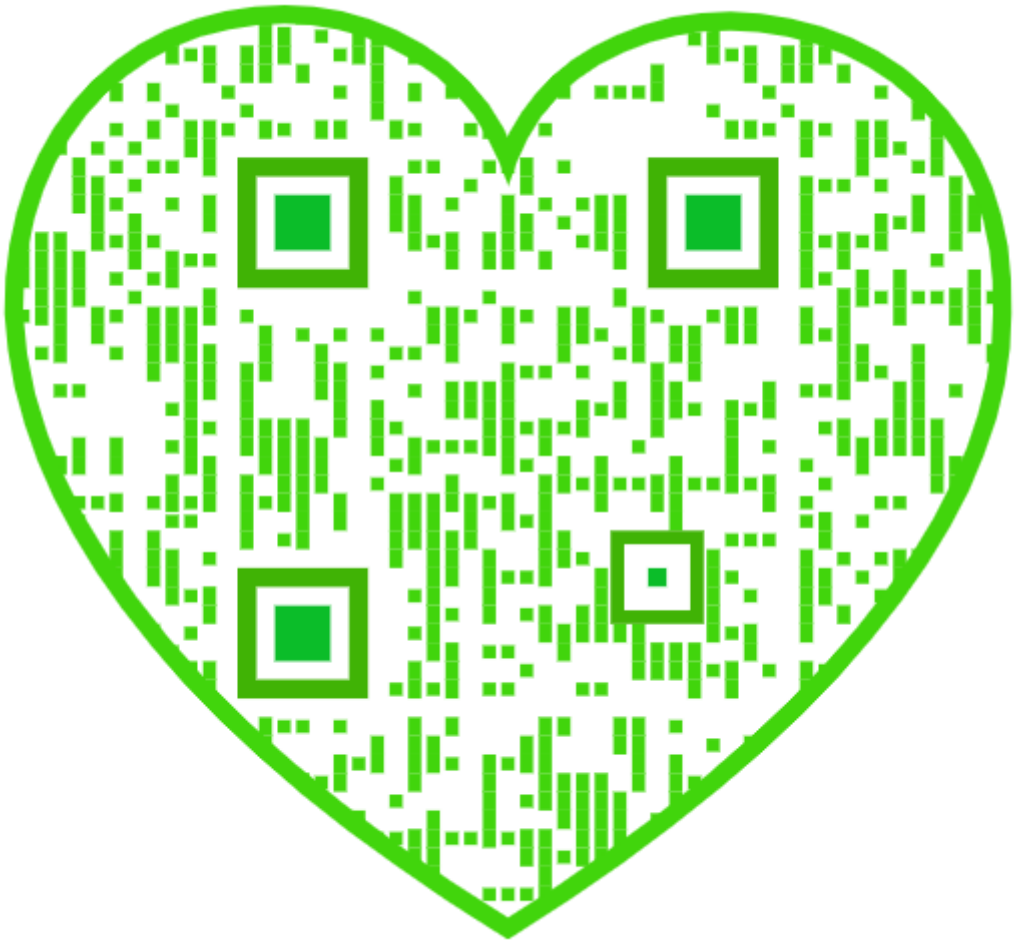

A VISIT TO THE GREAT VOLCANO OF KILAUEA.

Among all the objects of natural scenery in the world, the one pre-eminent for its terrible grandeur is the great crater of Kilauea. Although this lake of molten lava, with its clouds of sulphur and billows of fire, has been repeatedly described, its constant changes make it an object of ever renewed interest. It was recently visited by Walter M. Leman, an old Californian, who gives a stirring description of its present appearance in the San Francisco *Bulletin* of Oct. 22d, from which we take the following extracts:

THE CRATER.

"The crater is of gigantic dimensions. It is of an oval form, upwards of three miles in length, by two and a half in breadth, with perpendicular walls or sides of from 600 to 1,000 feet in depth, paved with a black flooring of lava. In its center is the living lake of fire—the surface of which cannot at present be seen from the outer rim of the crater, and which in the day time, from that position, shows only a slumbering pit—surrounded by jagged walls of desolation, from which the smoke slowly and continually ascends and rolls off, generally to the northwest. To the right hand are the sulphur-beds, native deposits containing thousands of tuns of sulphur. In front and on each hand are innumerable rifts and chasms in the earth, known as 'steam holes,' from which vapor continually arises, and in which the heat is of various degrees, from moderately warm to scalding. The phenomena exhibited by the action of this escaping steam on the atmospheric air—on moonlight nights—is said at times to be wonderful and grand. A jagged pathway, a short distance from the house, leads down into what may be termed the first bench of the crater, where stunted trees and ferns contend for a foot-hold on the very borders of eternal fire and ruin. Here also the ohelo, a juicy berry, hangs abundant on the bushes, and the strawberries ripen in the sun."

DOWN IN THE ABYSS.

"The weather on this and the succeeding night was inauspicious for a visit to the crater; and not until the 27th was our party favored with a night visit to the burning lake. At 3½ P. M., our preparations being completed, we started, intending to remain, if circumstances favored us, until the following morning. The weather was dubious, for a thick mist commenced falling as we began the descent. Following our guides we scrambled down to the first bench, and moved along over the trodden path, carefully avoiding the gaps and steam cracks. In looking from the upper bank one does not realize the depth and dimensions of this immense bowl in the earth, but the descent and consequent fatigue remind him of it. A walk of some half or three-quarters of a mile, sometimes ascending and sometimes descending, brings you to the lava floor of the crater—an impressive sight, as if molten iron had rolled up in huge billows, and cooled upon the gravely shore, from which you step upon their adamantine surface. What from the upper bank appears a comparative level, proves to be rough and jagged and rifted into a thousand fantastic and tortuous forms, changing with every advancing step. Deep chasms occur frequently, caused by the cracking of the lava, of from six inches to four feet in breadth, varying in depth to forty feet or more. Across this rugged and awful pavement you advance towards the Stygian lake in the center, passing cones and pinnacles of lava rock, sometimes thrown up in ridges like a mountain chain, at other times in isolated singleness. Several of these are miniature craters of themselves, 30 to 50 feet high, expelling flame and sulphurous vapors with the noise of an iron furnace. One remarkable manifestation of this kind bears a strong resemblance to a chapel in ruins, with its towers and pinnacles and battlemented walls still standing and looking as if seared and blasted by fire. To this has appropriately been given the name of 'Pele's Church.' By direction, our guides diverged from the direct path, deflecting to the left hand, in order to show us the 'caves,' as they are called. These are immense chasms in the lava floor, down which we clambered from 30 to 50 feet, and thence under the overhanging roof of broken lava for a distance of 150 or 200 feet further, to the great peril of life and limb. We were preceded by our guides with lanterns. Spiracles of lava, encrusted with a species of gypsum, are here obtained, and stalagmites of most curious and beautiful formation sometimes reward the patience and danger of the explorer. But the caves themselves are very pits of Erebus, from which, after an hour or more expended in threading their dark mysteries, we were glad to emerge once again to the light."

THE BURNING LAKE.

"Resuming our path towards the Burning Lake, as the day declined, with careful step we clamber down the inequalities and mount the congealed waves of lava for about a mile or a mile and a quarter; but long before we come to the brim of the abyss we are made aware of its activity by the noise of the terrible cauldron. It is quite impossible to convey an adequate description of this terrible scene. The reader is apt to think the relator carried away by the enthusiasm of his feelings, and fears he may be listening to the language of hyperbole and exaggeration; but no language can truly describe what is absolutely indescribable. For the last half century travelers have at various times visited the Crater of Kilauea, and hardly any two visitors have agreed in their description. This is not strange either, for this ever-burning and unquenchable lake—this awful valve for the pent-up flames of our earth's center, is ever changing its aspect, ever grand, mysterious, terrible!

"The surface of the lake, on the occasion of our visit, appeared to be about 40 feet below the rim upon which we stood, which rim or bank is composed of different strata of calcareous and other earths of exceedingly irregular formation. A depression in the shores of this pit appeared on our right hand, as we stood facing the northeast, from the rifts and chasms of which sulphurous vapors arise, and were swept off to the north, along with the clouds of smoke from the burning lake. On the left hand, the bank rose to a cliff some 30 feet higher than the level of the rim elsewhere; part of this cliff or precipice had some few weeks previous to our visit broken off and fallen into the pit; the rest threatens to follow, a wide chasm being visible between it and the rest of the bank. The part remaining assumes, from a standpoint of some 60 feet to the right hand, the severe outline of a human face, gazing down into the boiling cauldron, whose flaming surface casts through the gloom of night a spectral illumination over the hard features of this lava Sphynx. In the center of the lake arose an island of hardened or congealed lava of the apparent area of 10 by 20 yards, and elevated some 15 or 20 feet above the surface. The lava flood was, with slight interruptions of a few minutes, in continual action during the five hours we remained. Around the whole rim of the lake, where the lava impinged against the bank, a circle of sheeted flame and molten fire glowed with intense brilliancy, and a like belt of boiling fire encircled the island in the center; while every few minutes, in one or other part of the surface, the lava cauldron would commence to heave in fiery throes, momentarily accelerating in force, propelling the jets of crimson metal up 10, 15, 20 and 30 feet—indeed, oftentimes as high as the bank upon which we stood. These fiery jets would run one into another, until frequently as many as six or eight were in furious action together, when their united power would suddenly open a blazing seam across the blackening surface of the lake, which had rapidly cooled since the convulsion of two or three minutes previous, and then the liquid flood, released from the hardening crust which kept it down, would roll in flaming combers across the whole surface and then dash upon the Stygian shore."

FACTS CONCERNING THE VOLCANO.

"The crater of Kilauea is situated on the eastern flank of Mauna Loa, at an altitude of about 5,000 feet, and is approached by a not very difficult ride from Hilo of 30 miles. A shorter ride of 10 miles from the little Bay of Apua, on the south-eastern coast of the Island, would be attended with less fatigue than the journey *via* Hilo, but vessels rarely touch at that point. Passengers by steamer from Honolulu sometimes land at Kawaihae, on the western coast, and ride across the Island to Hilo; but it is a rough journey of 80 or 100 miles. For many reasons the trip by the way of Hilo is preferable.

"The volcano has been in positive activity since it first became known to civilized man, and in all probability for ages previously; but its activity varies greatly at different times. Several tremendous eruptions have occurred within the remembrance of our generation. From 1856, for three years, the volcano was in a state of unusual energy. In the latter part of January, 1859, a great eruption took place on Mauna Loa, when a new crater was formed at a much higher altitude than that of Kilauea. The lava torrent took then a northerly direction, and rolling over the plateau of another mountain plunged into the sea destroying a small fishing village in its course. Observers of this phenomenon, who hastened to Hawaii, were repaid by a spectacle of unparalleled grandeur. The fire rose 250 feet above the crater in a cone of flame, and the plunging lava curved along the mountain sides like a fiery serpent, leaping in a solid flood from precipice to precipice.

"When Mr. Ellis visited Kilauea, in 1822, he and his associates saw 51 conical crater islands of various sizes rising round the edge, or from the surface of the burning lake. Half of these emitted smoke or flame, or vomited streams of lava. Tradition, and the observation of the residents of the Islands, all go to prove that the volcano is in a constant transition state, sometimes more active, sometimes less, though for the past few years its general activity has undoubtedly decreased, notwithstanding its occasional fiery outbursts. An old resident of Maine, a gentleman of integrity, who visited it thirty years ago, assured me that the burning lake then occupied fully one-sixth of the area of the crater. Estimates of its present superficies vary. We thought it could not be less than 700 feet in diameter.

"The dark mythology of the Hawaiians has invested this appropriate arena with additional horror. It is the dwelling-place of their awful goddess, Pele, the prime divinity of their pantheon. Here, in company with her subordinate demons, she bathed and disported in its sulphur waves. Christian courage, here, too, subdued supernatural terror, when in 1825 the converted chieftainess, Kapiolania, braved the anger of the goddess and the attendant terrors of the path by descending alone into the crater, and casting with her own hands into the seething gulf the sacred berries, as an open and avowed act of desecration."

Great Improvement in Beef Packing.

In all the beef packing houses of this city, save one, the same process that was gone through in killing, drying, cutting, and packing ten years since exists now. There has been no change, no improvement, and little or no progress, except in the trade. A visit a few days since to the beef and pork packing establishment of A. E. Kent & Co., on the South Branch of the Chicago river, however, satisfies us that inventive genius has commenced operations even in this branch of industry. Hitherto the cutting of beef for market into mess, extra mess, prime mess, India mess, etc., has been done by hand—by single man power—but during the present season A. E. Kent & Co. have introduced circular saws and steam power. Two large saws have been erected which are driven by steam, and these saws are made to do the work of upwards of twenty men with hand saws, and in a much neater and better manner than formerly. The application of circular saws in cutting beef has been experimented with repeatedly by others, but it has never met with success till now. The great difficulty to be overcome was the clogging of the saws with the meat, so that no power could be applied that would make them work smoothly and regularly. Thanks, however, to Yankee ingenuity, this has been overcome. Besides the main table on which the saws are placed, a false table has been erected, running on rollers, so constructed that when the saw passes through the quarter of beef, the divisions of the table gradually spread, and this keeps the meat from interfering with the progress of the saw. The invention is very simple, but none the less valuable because of its simplicity. A whole quarter of beef is placed on this false table, which is pushed against the saw, and as the sawing proceeds, the table gradually spreads, so that the only part of the saw which is touched with the meat is the edge.

To test the labor-saving qualities of this improvement the product of ten head of oxen was placed on the table, to be cut into mess beef; the manager took his watch in his hand, and gave the order to start. Away went the saws whirring, and quarter after quarter of the beef disappeared, after having been

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cut into small pieces; and in exactly six minutes from the time of starting the whole ten head of oxen were cut! Now, this was all done with two saws and six men, who fed them and took off the pieces as they were cut. At this rate these two saws and six men could cut up one thousand head in ten hours. This shows the capacity of the improvement when fully tested. But with ordinary running, the two saws and six men can more easily cut five hundred beeves per day than could fifteen men two hundred per day by the old hand saw process.

Here then is a saving of more than one-half the labor and about two-thirds of the time usually employed, and also a great improvement in the manner of cutting. When offering mess for sale the inspectors are particular in seeing that the pieces are cut square and smooth. If they are not they are rejected and branded inferior. This damages the sale, and the owner incurs a loss thereby. By the application of these saws every piece is cut alike—there are no haggled pieces, no ragged edges—every piece is cut smooth and clean and square. In this respect alone not to speak of the labor saved—the invention is a highly valuable one, and cannot fail to be greatly prized by the trade.

But Messrs. A. E. Kent & Co. have made other improvements in the beef packing department. Instead of killing the steers with a hammer, by knocking them on the head, they are shot in the head from a breech-loading rifle. Besides being less cruel, this is a much quicker mode, and the animals die instantly. Then as soon as they fall and are bled, a chain-drag is attached to the horns, and by turning a lever, steam power is applied, by which the carcass is immediately dragged from the slaughter pen into the dressing room. This is a great improvement on the old appliance of ropes, with block and tackle. Another improvement has also been introduced, which consists of a railway conductor, by which one man can convey an entire beeve from the dressing room to the hanging room. This has often been introduced into the pork packing establishments, but has never been used in hanging beeves.—*Chicago Tribune.*

THE MILITARY RAILROAD SYSTEM OF THE UNITED STATES.

Mr. Benjamin C. Truman writes the following interesting letter to the New York *Times*:—

Few persons, even of those in the highest military stations, are acquainted with the gigantic efforts which have been called into requisition to sustain our armies occupying this portion of the South-West.

It will be remembered that Nashville was first occupied by National troops in February, 1862. The Confederate forces, before retiring from the city, destroyed everything in the shape of machinery for manufacturing purposes, stores, etc.; but most particularly did the retreating enemies employ themselves in making complete their work of destruction in the shops and manufactories attached to the Nashville and Chattanooga, and the Tennessee and Alabama railroads, which had been of the most vital importance to the railroad system of this section, and eminently so in assisting the progress of the rebellion. Everything in the shape of locomotives and rolling stock was, of course, removed.

There are now about fifteen hundred miles of road, employing eighteen thousand men, as mechanics, engineers, blacksmiths, conductors, brakesmen, laborers, etc. The rolling stock consists of two hundred and seventy-one engines and three thousand cars, while the buildings erected within the past year, and occupied by this particular branch, extend for several miles—a detailed description of which I shall give below. I will add, however, that these buildings are built upon the most improved plan of wooden structures, all of which are guarded, day and night, and protected against fire by a multiplicity of rotary engines, steam fire-pumps, cisterns, etc.

All this is, in a great measure, owing to the sagacity and zeal of Gen. McCullum, Col. J. C. Crane and Mr. Anderson, to whom the country at large is greatly indebted. To Col. Crane must the highest honors belong, for the existence of this stupendous transformation. His is the executive eye, and to him almost entirely belongs the credit of bringing about this great change. Great credit, however, is also due to Gen. McCullum, Mr. A. Anderson, and the Commander-in-Chief of the Military Division of the Mississippi, who, together with Col. Crane, have shown to the world a new feature in the art of war, namely, building a railroad which shall keep pace with an advancing army, and each evening deliver its necessary supplies for the coming day.

The expenses incident to the running of the military railroads in the Division of the Mississippi, including the purchases of material and the payment of employees, reaches the astonishing sum of $2,200,000 per month.

Below I give a detailed description of Col. Crane's department, the result of a visit which I made on Tuesday last.

LOCOMOTIVE AND MACHINE DEPARTMENT.

This is by far the immensest establishment of the kind in the country—perhaps in the world. I shall endeavor to give you a fair view of its exterior and interior, realizing the fact, however, that no pen-picture can urge the imagination to a proper conception of its vast proportions.

The locomotive and machine department is under the efficient superintendence of Mr. E. P. Benjamin, and employs three thousand men. The main building is two hundred feet long and eighty wide, and is in process of extension, its projected extreme length to be four hundred and fifty feet. The upper part of this building is used for rebuilding and repairing locomotives and tenders, and is called the erecting floor. This capacious room will accommodate thirty-four engines at a time. Really, the shop has not yet built a new locomotive; but every piece of machinery necessary in the construction of an engine or locomotive, with the exception of the wheel tire, has been turned out. Captured and crippled locomotives find their way into this shop, and in a few weeks steam out as good as new. The foreman of the locomotive shop pointed out to me a magnificent looking engine which had been *elevated from a worn-out boiler.* Everything about the structure had been manufactured in this shop, except the boiler and driving wheels. While I think of it here, nothing is manufactured by the government, the foreman informed me, which involves a loss, except a steam whistle. These can be bought cheaper than they can be manufactured, and the manufacture of them in whole has been discontinued in consequence.

MACHINE SHOP.

Adjoining this huge building is the machine shop, which is over 200 feet long, filled with the most improved machinery of the age, up stairs and down. There are some very fine machines down stairs, including a marine lathe, for turning heavy shafting; a lathe for truck axles; compound planer, for all kinds of light planing; two heavy planers; drill press, for doing all sorts of light and heavy drilling; heavy drill press; large lathe, for turning locomotive driving wheels; slotting machine, used for horizontal planing; and two boring mills. In the upper machine shop are five bolt-cutting machines, capable of doing the heaviest of work; cotter and key-seating machine, self-feeding; several gear-cutting machines; six drilling machines; large boring and turning mill; large hydrostatic press, for putting car wheels on axles; two large driving-wheel lathes; seven planing machines; two milling machines, and twenty lathes, of all sizes and descriptions. The entire machinery is new, and of the most improved pattern, and is chiefly from the well-known establishments of William Sellers, Philadelphia; Bement & Dougherty, Industrial Works, Philadelphia; Putnam Machine Co., Fitchburg, Mass; Lowell Machine Co., Lowell, Mass.; John Paishley, New Haven, Conn., and others.

The machinery of the whole establishment is run by two horizontal engines of 300 horse power. These engines were formerly in the Memphis Navy-Yard. After the breaking out of the rebellion they were removed from Memphis and placed in the gun-factory erected in this city by the enemies of the country, for the manufacture of small arms. The engine and fire-room is a perfect parlor, over which towers a chimney 130 feet in hight, the brick used in the its construction having been taken from old houses which were torn down for that purpose.

BLACKSMITH SHOP

One of the most perfect and completely-arranged blacksmith shops is connected with the locomotive and machine department. The foreman of the shop Mr. Duncan Livingstone, pronounces it the completest workshop of the kind in the country. It is about 200 feet in length, and eighty in width, and employs nearly two hundred of the best blacksmiths that could be found, all of whom receive from $3 50 to $10 a day. There are forty forges which are blown by steam. By an invention of one of the employees of this shop the ashes and coal-dust is carried off by the same blast which blows the fire, making the forge present a clean appearance at all times. Every variety of heavy work as well as light is turned out here.

Connected with this department is a foundry, in which all kinds of work are turned ont. There are also carpenter and pattern shops, in which the wood-work for the locomotives and tenders are manufactured.

A "round house," which is to be the largest in the country, is in process of erection, which, when completed, will have sixty stalls, and will be so constructed that 100 locomotives may be accommodated at a time.

THE CAR DEPARTMENT.

The main building of the car department is 202 feet long and 80 wide, and is solely used for the manufacturing and repairing of cars. At present Mr. Herrick is having a headquarters car built for Gen. Thomas, which, for convenience and elegance, is the finest affair I have ever seen. With the exception of the ornamental work, this model combination of house and carriage is complete. It is an iron-plated vehicle, 50 feet in length and of the usual width, containing a kitchen, dining saloon, sleeping apartment, wash-room, water-closet and office. Nothing could be more complete, while the upholstery and ornamental work is *recherche.*

The cars are all ventilated by an invention of the manufacturer, and when empty present an incomprehensible mass of network, composed of iron and india-rubber. Each car will accommodate 36 badly wounded. The hospital train always follows the passenger train, and the utmost care is taken to guard against accidents, and I will state here, that since the commencement of running these improved hospital carriages, no soldier has sustained the slightest injury. There are attached to the Car Department a blacksmith's shop, brass and iron foundries, and paint, glass and upholstery shops, besides a spacious storehouse. The blacksmith shop is upon the same order as the one in the locomotive and machine department, except that it does not employ so many hands. This shop, in connection with the iron foundry, manufactures all the iron work and castings used about a baggage or passenger car and engines. The brass foundry turns out all the articles of this metal required about cars and engines, all of which are handsome specimens of excellent workmanship. Every ounce of dust and dirt is saved, and all the sweepings of the foundry, and washed out like gold dust. The paint, glass and upholstery shops employ about a hundred hands, who are kept constantly at work at their various trades. The employees in the car department are as amply accommodated with lodgings as those at the locomotive and machine shops.

COL. CRANE.

I cannot close without saying a few words more in relation to Col. John C. Crane, the efficient and accommodating Quartermaster who is at the head and front of this immense railroad fabric. Col. Crane is one of those extraordinary young men who, despite the great responsibilities of his office, the continuous annoyance that must necessarily exist where so many employees are congregated, bears all with seeming ease. His office is at all hours besieged with a crowd of men, each of whom brings his story of grievances, or request for favors, to all of which he listens with kind attention, tendering such advice as his judgment suggests as most likely to subserve their interests and the welfare of the Government. Every spike, every nail, every foot of timber, every pound of metal used in the shops and on the roads, must be properly accounted for, as well as every dime of the $2,200,000 which is monthly expended. Col. Crane entered the service as a private soldier in the First Missouri Cavalry, but he was shortly after selected for a more prominent position—one more fitting his ability. By his devotion to duty, etc., he has fairly won his present rank.

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MISCELLANEOUS SUMMARY.

ILLINOIS COTTON.—The editor of the Peru *Herald* was presented, a few days since, with a sample of this season's cotton, raised in Illinois. The fiber, he says, is as fine as that raised further South. The owner of the plantation from which this sample was taken, has 260 acres under cultivation, which will average nearly one bale per acre, and at the present price per pound, he will make, clear of all expenses, one hundred thousand dollars. From this experiment, who will not say that eventually the southern part of Illinois will yield large quantities of this indispensable agricultural product, and at a profit equaling any other crop. It is found by experiment, this season, that the cost of the cultivation of cotton does not exceed that of corn or other staple agricultural products.

WINE AS MEDICINE.—A celebrated physician, residing at Metz, has written a treatise on the medicinal qualities of wine, in which he states that, considering wine in the point of view of the mineral salts which it contains in large quantity, such as potash, soda, lime, magnesia, iron, manganese, chlorides, sulphates, carbonates, phosphates, the juice of the grape constitutes a real natural mineral liquid as active and even more charged with mineral principles than many justly esteemed spirits.

A NEW NATURAL BRIDGE.—Some of our soldiers, recently discovered on Laurel Fork, in Upshur county, Va., a natural bridge spanning French creek. It measures on the under side fifty-one feet in length and twenty six in breadth, beautifully arched in solid stone. The bed of the creek is strangely carved out of solid stone, and flows swiftly on, "making music of a melancholy sort." The scenery around is wild and picturesque; unbroken forests spread out through hill and dale.

PROF. PEPPER, the inventor of the ghost illusion, is again giving lectures in London. After one of these, "Paganini's Ghost" was introduced in the large theatre, and having first surprised the audience by the spectral character of the illusion, the ghost still further astonished them by his marvelous performance on the violin, which elicited shouts of applause. The spirit of the great Maestro was represented by Mr. Levey, a London violinist.

PERILOUS SERVICE.—The engineers attached to the torpedo boat *Stromboli* are:—First Assistant, John L. Lay, commanding; Second Assistant Engineers, Charles H. Stone, J. B. Chadwick, John Smith; Third Assistant Engineer, Byro S. Heath. These gentlemen have received their commissions with the understanding that they are to perish with the vessel if it become necessary to destroy her, to prevent the enemy from capturing her.

A LARGE number of packages intended for the army arrived at the Washington Post-office with the wrappers destroyed or the addresses so mutilated that they cannot be forwarded, and are therefore necessarily sent to the Dead Letter Office. It is especially suggested that persons sending packages write on a card the full address, and fasten it securely to the contents of the packages, inside the wrapper, and this will secure prompt delivery.

CURIOUS RESULT OF A BROKEN DRIVER.—The freight train which left Nashville early on Friday morning broke one of the driving wheels, and at every revolution broke rails. Some twelve hundred rails between Nashville and Gallatin have been rendered useless. The damage will amount to $20,000. There must have been an intelligent engineer driving that train.

TO DESTROY BEE MOTHS.—Take a pan of oil or grease at the time the miller is ready to begin to lay its eggs, and insert a wick in the middle of it, and light about dark, set it near your bee-hives, and the millers will be attracted to the light, and being blinded by it, will readily drop in the grease and die.

THE New York *Herald*, of the 19th ult., alluding to the oil wells of Pennsylvania, says: "before long it will be necessary to sink *ponderous shafts* to get out the product of the oil mines." It would be interesting to know exactly how ponderous a hole in the ground is.

AN ingenious Parisian has invented a boat in which persons can bathe, the water flows through it, and moves about at the same time. It is a sort of moving cradle, with a tent roof and sides, and has a kind of hand propeller. This must be a remarkably useful thing.

SPEED OF OUR BLOCKADE STEAMERS.—When the Anglo-rebel blockade breaker *Annie* was recently caught, she was running 19 knots an hour, and her engines were making 200 revolutions per minute, but she was overhauled by the U. S. steamer *Wilderness* in about three-fourths of a mile.

A LIGHT draft Monitor on the Red river ran ashore, and was attacked by infantry and light artillery who were scattered by the fire of her revolving turret, with the loss of their General and five hundred men —not a life lost on board the Monitor.

HOW TO CATCH HAWKS AND OWLS.—Erect in the middle of your field a long pole. Set a steel trap upon the top, and the unwary hawk and owl will light directly in the trap. By this means hundreds may be taken in one season.

THE Pittsburg *Gazette* says the apple crop in Western Pennsylvania is enormous, and though apples command high prices now, it expresses its belief that they will sell at seventy-five cents per barrel before Christmas.

BAND CUTTER.—A correspondent of an exchange wishes inventors to turn their attention to some implement for cutting the bands of grain bundles for the threshing machine, and suggests a revolving wheel attached to the machine to do the desired work, while the grain is in the hands of the feeder.

RAGMEN are with the army of the Potomac buying up and gathering woolen and cotton rags wherever they can find them, and paying for the rags as high as eighteen cents per pound.

AT Rouen, France, a floating iron warehouse has recently been launched. This structure is intended to contain explosive substances or articles liable to take fire spontaneously.

THE largest boat ever designed for western waters is now building at Jeffersonville, Ind. She is 312 ~~feet~~ long, 40 ~~feet~~ beam, and 9½ ~~feet depth of hold~~. She carries 2,000 tuns.

THE profits derived by McCormick from the reaper business, up to the date of Commissioner Holt's decision, are stated by that eminent official to have been $1,297,915 66.

No less than 300,000 stand of arms and some rifled cannon have been, we are told, shipped from England this year, all for Japanese nobles, and all invoiced as "hardware."

THE objection to raising potatoes is, besides the hard work, that it yields no manur for the farm, and consequently tends to the exhaustion of the fertility of it.

THE total amount of National Bank Currency now in circulation is $64,529,470. The amount issued last week was $2,149,080.

THE issues of the London daily papers together amount to 248,000 sheets daily; of all the weeklies together, 2,253,000.

IT is said that a machine, capable of turning ten twenty-inch shot in one hour, is now on exhibition at the Boston Exchange.

How to Have Flowers Double.

A young lady in Central New York wrote to the Farmers' Club, says the *Country Gentleman*, saying that some of her balsam and aster plants produced flowers double, while on the other plants the flowers were all single, and asking if the Club could tell her how to have all her flowers double.

Mr. Pardee said:—"The remedy for this difficulty is simple and effectual. When a plant produces a flower with a single row of petals, it must be inexorably torn np by the roots and trampled in the path. Balsams, pinks, asters, and all that class of plants, are apt to have seeds which will produce plants that will bear single flowers; and if the pollen from these be allowed to fructify the flowers of other plants, the whole bed will be hybridized, and the following year a crop of inferior flowers will be produced. On the other hand, if the plants that bear single flowers are firmly sacrificed, the seed will improve, and frequently very fine and curious flowers will be obtained."

French Tenement Houses.

The question of tenement houses is always interesting. Abroad they are improving the dwellings of workmen. In Paris they have what is called the Cite Ouvriere, in the new street, Rue de Campagne Premiere, leading out of the Rue d'Enfer. This consists of a number of very neat houses, only three stories above the ground flooor, with two sets of apartments in each story. They are inhabited by 600 people, and produce a revenue of 45,000 francs, or £1,800, a year. Each set has a sitting room, about 12 feet square, one bedroom only, and a small kitchen. The height of every story is 2½ metres, or nearly 9 feet. Gas and water are laid on, and there are conveniences for stowing wood, &c. Each set lets for 250 francs, or about $50 per annum. Although deficient in accommodation, they are a great improvement on the garret and cellar system. The rent is paid readily, and the place is always filled. But better by far than these are a large row of dwellings which are now in progress of erection by a very public spirited and enterprising individual, M. Garand, in the Rue Popincourt, Faubourg St. Antoine. They are from the designs of M. Oslin. There are four sets of apartments on each floor, consisting of three rooms and a kitchen, with every convenience. These, though much larger and more commodious than those formerly described, can be let for 300 francs, or $60 per annum. The principal room is 14 feet by 12 feet, and 9 feet high. On the upper or fifth floor are to be single rooms for bachelors, which are to be let furnished for 20 francs a month, or $48 per annum.

How do the mass of the inhabitants live in New York? Let facts and figures show. Three-quarters of a million live in tenement houses. Of 116,000 families in the city, only 16,000 have an independent home by themselves. 14,362 families live two in a house, and 4,416 live three in a house. In the 11,964 houses not included above, 71,388 families live, or rather stay; 7 families, or 35 souls, in each house. This is the average; while in the Eleventh Ward, 113 rear houses, or the back ends of lots reached through alleys, contain 1,653 families, 170 to a house. Others have 80, and some 95 persons living in them. In one Ward 29 houses hold 6,449 souls—187 persons in a single house. In one house there are 112 families. In another there are 500 low Irish and German persons huddled together. Packed into a single block are in some cases people enough to make a city of the size of Utica, N. Y. To call these barracks by the name of houses has been well described as follows:—"A structure of rough brick, standing upon a lot of 25 by 100 feet, from four to six stories high, and so divided internally as to contain four families on each floor—each family eating, drinking, sleeping, cooking, washing and fighting in a room eight feet by ten; unless, indeed, the family renting these two rooms takes in another family to board, or sub-lets one room to one or even two other families." Of course, most of the rooms are so dark you can scarcely see in them of a cloudy day; and as to ventilation, water and other closets, or any of the comforts and conveniences of a home, they are not to be thought of. Stench, indecency, glooom, demoralization—these are the attendants. Is it not strange that children and adults can live while crowded into such places? And is it strange that vice and brutality rage rampant?

German Silver for Bearings.

Have any of our mechanics ever tried German silver for hot bearings? It is rather costly, but for chronic hot bearings and on fine work money is hardly an object. From its nature it would seem to be an excellent thing, as it is tough, feels "greasy" to the touch, and has a close grain analagous to Babbitt metal. Here is a formula for making it:—It is composed of 25 parts nickel, 25 zinc, and 50 copper. To roll, it is better to make it 60 copper and 20 zinc. True German silver is 40·4 copper, 31·6 nickel, 28·4 zinc, 2·6 iron. By varying the proportions somewhat a useful composition might be made, which could be sold profitably.

FORCE OF A BOILER EXPLOSION.—By a recent boiler explosion in England a ball weighing 54 pounds was blown 480 yards, and a fireman thrown across a roadway and over the tops of houses to a distance of 220 yards.

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PROFESSOR TREADWELL ON HOOPED CANNON.

Professor Treadwell has issued another pamphlet on hooped cannon, in which he demonstrates some new principles in addition to those which he has heretofore expounded.

In his pamphlet on the same subject, issued in 1845, he showed that in a gun with walls of a thickness equal to the bore, it would require four times the pressure to produce cross fracture that it would to split the gun lengthwise. He therefore argued that in making cannon of wrought iron the fiber of the iron should be wrapped around the gun instead of being parallel with the bore.

In the little book published in 1856, the position was taken that the iron should be put on in the form of hoops, and the outer hoops should be stretched, or in a state of tension. This results from the fact, that where a cylinder formed in this way is extended by internal pressure, the inner hoops are stretched more in proportion to their lengths than the outer ones. Our author says:—

"If we make a cylinder of 41 concentric hoops of equal thickness, disposed one within another, and exactly fitting, so that the particles of each hoop shall be in equilibrium with each other, the diameter of the largest being five times that of the smallest, then the force of each, beginning with the innermost, to resist distention, will then be represented by the following numbers:—

1000	250	111	62
826	225	104	59
694	207	98	56
591	189	92	54
510	174	87	51
444	160	82	49
391	148	77	47
346	137	73	45
309	128	69	43
277	119	65	41
			40

"An inspection of these numbers must, I think, impress any one with the fact, that it is impossible to increase essentially the strength of cannon by a simple increase of thickness."

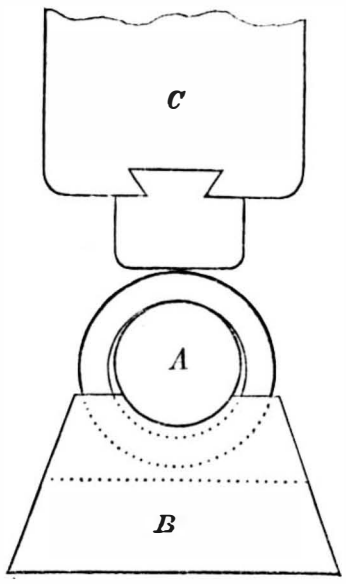
But if the hoops are of malleable metal they will be drawn out by the pressure between the gases and the inclosing hoops, as iron is drawn by being beaten on an anvil. Professor Treadwell says that owing to this property fractures in bronze and wrought-iron guns commence at the exterior surface, while in cast-iron guns they commence at the interior.

Wrought iron is somewhat elastic; if stretched only a very little it will resume its original length; but if it be stretched beyond the limit of its elasticity it will be either permanently elongated or ruptured. If the inner hoops of a cylinder are extended by internal pressure beyond the limit of their elasticity before they are restrained by the inclosing hoops, they will be ruptured; the strain will then come upon the next hoop and thus all will be broken in succession, their strength not being combined to resist the pressure. This combination of strength can be attained only by having the inclosing hoops all in a state of tension.

The elasticity of wrought iron may be very much increased by cold hammering and stretching. This was proved by Professor Treadwell in an elaborate series of experiments, which are described in the new pamphlet just published. It is proposed to strengthen the guns by giving to the bands this increased elasticity.

"To construct one of the hoops for a cannon of the size before-mentioned, that is of 14-inch caliber, the hoop having, when finished, 27·972 inches internal diameter, and being 3½ inches thick, and 15 inches long (or broad), I take a flat bar, say 14 inches wide, from half an inch to an inch thick, and of such length that, when wound into a coil, it shall form the thickness required for the hoop, after allowing for the waste in welding, forging and finishing. After its ends have been scarfed to a long wedge form, it is to be heated to a low red heat, and then wound upon a cylinder of say 25 or 26 inches diameter, as a ribbon is wound upon a block. Next, it is to be heated in a proper furnace to a good welding heat, and then, being placed upon an arbor, or mandrel, of about 25 or 26 inches diameter, and between proper dies, sets or swages, it is to be completely welded, or the several layers or coils are to be made to form one piece. This may be done by compressing it with the swages, by a hydrostatic press, or by a steam hammer. After it is properly welded and condensed in this way, and has cooled as low as 600°, it is to be placed upon a cold arbor or mandrel (shown in section at A, Fig. 7), which is supported at both ends by the

Fig. 7.



upright studs of the heavy iron frame, B. It is then to be hammered by the steam hammer, C, until its internal diameter is enlarged to about 27 inches. The last part of the hammering is to be performed after the hoop has become cold. Instead of operating in this way with the steam hammer, we may produce the same effect upon the hoop by a rolling-mill, in which the operating part of the rollers is made to project beyond the housings, or frame.

Fig. 8.

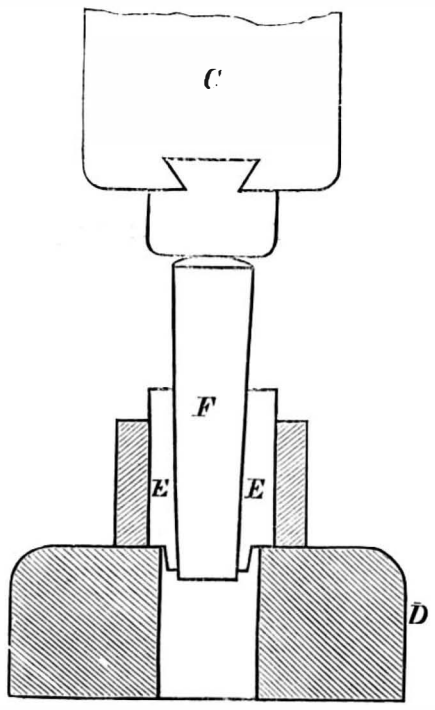
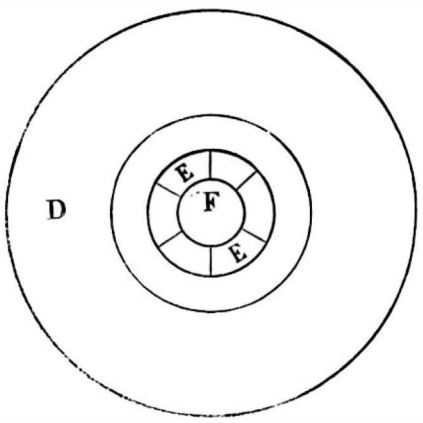


Fig. 9.



"After the hoop has been condensed and enlarged in this way, it is next to be placed upon an annular anvil, D D, (Figs. 8 and 9), and the segmental swages or blocks, E E, are to be adjusted within it. These segments form a cylinder upon their outer surface, but inside they form a hollow cone. A solid conical plug, F, is fitted to be driven into this hollow cone within the swages. With this arrangement, the whole being under the drop or steam hammer, C, the plug is driven by repeated blows into the hollow cone, by which operation the hoop is stretched sufficiently to destroy all conflicting strains or tensions that might have been produced in it by the hammering. The strain is thus reduced to a circumferential direction, and the hoop put as near as possible into the condition of the hard wire after it had been subjected to the first series of strains.

"The hoop may be stretched by this last operation the $\frac{1}{100}$th part of its diameter, and, if it is made of very soft and tough iron and has not been hammered very hard, much more than this quantity. The extent, however, to which this hammering and cold stretching may be carried, must depend upon the quality of the iron and the heating and working to which it has been previously subjected. It will be well, when the stretching is commenced, to have the hoop warmed up to 200° or 300°.

"After the hoop has been prepared in this way by cold hammering and stretching, it is to be bored and turned; and, whether it is to be fixed to the gun by a screw thread, or by any equivalent, it is to be carefully and equably heated to such a temperature (but never up to an annealing heat), as shall expand it sufficiently, and, in this state, is to be placed upon the gun."

Professor Treadwell's pamphlet is published by Messrs. Little, Brown & Co., of Boston.

The Manufacture of Soda Water.

H. M., of Canada West, wishes for information in regard to the manufacture of soda water. Soda water is simply water saturated with carbonic acid under pressure. Water has the property of absorbing its own volume of carbonic acid at all pressures. At the atmospheric pressure a cubic foot of carbonic acid weighs $\frac{1}{544}$th as much as a cubic foot of water; at 2 atmospheres the quantity or weight of carbonic acid in a cubic foot is doubled, at 3 atmospheres it is trebled, and so on. As a cubic foot of water absorbs a cubic foot of the gas at any pressure, of course the higher the pressure the larger is the quantity by weight which the water will absorb. In making soda water the gas is compressed to the extent of some 10 or 12 atmospheres, and then when the pressure is removed the gas escapes, producing a sparkling effervescence. As the carbonic acid is generally obtained by pouring sulphuric acid upon marble dust, the apparatus must be so arranged as to prevent the poisonous sulphuric acid from getting into the beverage. This is done by the manufacturers of soda water apparatus. There are several of these manufacturers in this city, among whom are William Gee, William Johnson, A. & H. Johnson, and John Matthews.

An iron-plated frigate with a spur, named the *Ancona*, has been launched at Bordeaux for the Italian government. The *Ancona* is fitted with engines of 700 horse-power, and is to carry twenty-two guns. She is 220 feet long, 45 feet wide and 28 feet deep. She is covered with teakwood to the depth of twenty inches, and the iron plates are fastened over the teak. The flooring of the deck is covered with sheet iron. The *Ancona* measures 4,250 tuns.

The Pekin *Gazette* contains a report from the Chinese government on the extinction of the rebellion, which ends with the following words:—"It is, therefore, most needful that thanks be offered to the gods for their assistance. Wherefore, the Board of Rites is directed to examine into the services rendered by the different gods, and to report to us."

A distinguished agriculturist, of England, recommends the mixture of willow leaves in all kinds of fodder. Osier peelings may also be added with advantage. The mixture of the leaves and peelings above mentioned will be particularly useful in preventing the rot, a disease so prevalent among sheep in winter, from making its appearance.

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Correspondence

Tumbling of Projectiles.

MESSRS. EDITORS:—In my letter of criticism of the 8th ult., on guns and projectiles, I endeavored to show that it did not follow that because a gun did not shoot straight therefore it was at fault. From a knowledge of facts, and much experience, I concluded that it was more likely that in the case of the 600-pound gun the projectiles were more at fault than the gun. I have since become acquainted with a remarkable case illustrative of the correctness of my general views as stated, and which case has been developed since the writing of that letter. From one of the forts near this city a 3-inch Rodman gun (U. S. service) was sent to Washington Arsenal bearing this inscription, "This gun won't shoot straight." Probably from the press of business at this post the gun was overlooked. Two years rolled on, the gun bearing meekly the opprobious inscription. One of the young lieutenants, whose mind had profited by the every-day practical instruction elicited at this post, doubted the story. He examined the gun, and seeing nothing wrong with it, determined to test it practically. To this end, 3-inch Hotchkiss shell, 3 grooves, 5-second paper fuse, and 1 pound of powder, service charge, were used. Shot after shot was fired, each shell exploding in due time. The flight of every shell was excellent in every respect, and sound smooth. It was soon decided that there was nothing wrong with the gun. Doubtless, the officer who had tested the gun had used unsuitable projectiles, and given a verdict according to results.

I herewith give another example: Some time ago a gunsmith sent me an old rebel rifled musket for experiment, and with it I fired a number of shots, at short range, into pine plank. I found that every shot struck sideways, even at the short distance of six feet. On examining the rifling, I found that it was very much worn, and the bullet exhibited no sign of the rifling. I made new bullets, and drilled them out so much that they contained about the fourth of a charge. I notched the base end of the bullet so that powder would be exposed to the fire from the cap, and coated the end of the charge with collodion. The bullets being thus formed, I recommenced my experiments, charge and bullet in one. The result was, that every bullet went point first into the target, showing that the explosive force of the charge had expanded the base of the bullet, filling the shallow groove. In this case I would say that the musket was at fault, but it illustrates the value of the sabot.

On the same principle, I have experimented somewhat extensively with 3-inch shell, constructed with sabots about one inch in depth, and have witnessed unusually favorable results.

In your issue of the 5th inst. I observe that Messrs. Hotchkiss & Son state, in answer to my communication, that I failed to give the cause of the tumbling of his large projectiles. I purposely but courteously hinted my conviction that the lead band was rendered weak by the grooves described; I shall here state my views more in detail. The Hotchkiss shell is composed of three parts—sabot, lead band and shell. The bands holds the sabot or shell together; grooves have been formed from end to end for reasons given. As the shell has not corresponding grooves underneath the lead grooves, the lead is not more than about one-eighth of an inch thick in the channels. Therefore, between the shock of discharge and centrifugal force of shell, which is greater in the case of the 4½ than the 3-inch, the lead snaps asunder, and flies in pieces at the groove. The shell and sabot come apart, giving the appearance of an exploded shell. To harden the lead may be some advantage, but I think that sound philosophy would teach the necessity of corresponding grooves in the shell, and the shell in turn should be re-enforced, giving mutual strength throughout. I think Hotchkiss shell thus formed would give better results. Although I have a high opinion of this shell I think it stands in need of further improvement. This shell, moreover, when packed, rests on its base; this is another evil, for the thump of transportation on its sabot condenses the lead band, and, in some cases, increases the diameter, so that the shell is apt to stick in the gun, especially when foul. I think for that also a remedy might be had. Hardening the lead would operate well, but the lead band might also be made smaller in diameter than the shell; force enough would be left to drive the band into the grooves. There is no other shell in use where the entire force of charge is so concentrated on the sabot. This is a great advantage; more force is obtained than is necessary to give perfect rotation; hence, since this shell was grooved its range is increased by the reduction of friction, while the vent admits the flame to ignite the common fuse without fulminate, which is very desirable for safety and economy.

THOMAS TAYLOR.

Washington, D. C., Nov. 14, 1864.

About Steam Plows.

MESSRS. EDITORS:—Last winter I traveled all over the western country, from Minnesota to St. Louis, Cincinnati, Chicago, and all the principal towns. My business was hunting up steam plows and land locomotives. I was interested in everything that had steam and moved on the ground. At every town and village I could find two or three inventions in that line, more or less foolish. A few out of the number were, however, really ingenious. The most ridiculous thing of the kind was gotten up by the editor of the *Prairie Farmer*, at Chicago. I saw all the men that had been trying to plow by steam, their engines also, and compared notes with the inventors. All the plowing engines in that country have weighed from ten to fifteen tuns. Now just think of a steam engine of such weight traveling on the soft ground, and then ask it to plow! Was it not discouraging to find that all the men engaged in steam-plow business think that they must have a heavy engine to increase the traction on the ground. The facts of the case are, that an increase of weight will increase the necessity for traction faster than it increases the traction. A heavy engine will sink the wheels so far into the ground that the wheels will be traveling up a steep grade while on the level. A heavy engine drawing a heavy train on the rails is a different case. I intend to depend on sufficient claws on the drive wheels to make traction, and build my engine as light as possible. The cause of all the failures in steam wagons on common roads, and plowing engines, is to be found in the great weight of the engines. They have been obliged to carry along a surplus power to enable them to ascend steep grades and overcome difficulties, and such surplus power always includes a surplus weight, which surplus weight destroys all the practicability of the institution, if on the ground. Now, I propose to increase the power of the engine to suit any grade of hill, or any weight of train to be drawn, without increasing the weight of the engine, then it will be sensible to run on the ground by steam, and not otherwise.

PERRY DICKSON.

Erie City, Nov. 7, 1864.

Test of Air.

MESSRS. EDITORS:—A communication appears on page 295, current volume of the SCIENTIFIC AMERICAN, on "The Purity Test of Air," which contains a suggestion that an instrument might be invented to indicate the amount of oxygen in the atmosphere by allowing a jet of gas to burn in a limited supply of air. A very erroneous opinion exists in regard to the cause of impure air. We are often informed that the air in a close room is so poisonous as to almost destroy life, owing to the presence of carbonic acid gas. From recent experiments made by eminent chemists it is ascertained, that in a room inclosed by ordinary walls the amount of carbonic acid can never exceed one-half of one per cent. The most accurate experiments have never discovered more than four-tenths. This fact results from the well-known awl of "Diffusion of Gases." Thus, if two vials, communicating with each other by means of stop-cocks, be filled, the upper one with hydrogen, and the lower one with carbonic acid, though a barrier of india-rubber, earthenware, or even of water, be placed between, the gases will diffuse into each other, the light gas descending and the heavy gas ascending, until they are perfectly commixed. Now, the walls of an ordinary room are made of very porous material—brick and plaster especially so; therefore, the carbonic acid in the room and the oxygen of the outside air become commingled, and the air of the room retains its normal condition as far as the carbonic acid is concerned. This fact, while it proves the absence of carbonic acid, does not lessen the other fact, that the atmosphere of crowded and ill-ventilated churches, cars, halls and other rooms is very hurtful; for this reason, that a certain effluvium and organic matter is exhaled from the system, which, being inhaled, occasions the oppressive feeling we all know so well. The victims of the Black Hole of Calcutta perished, not from breathing carbonic acid, but, being overheated and crowded together in a small room, were suffocated by the effluvia arising from their own persons.

J. J. M.

New Haven, Nov. 16, 1864.

[Our correspondent's position is correct, provided time be allowed for the diffusion to take place, but time is necessary. Atmospheric air in a vessel may be displaced by simply pouring carbonic acid gas into the vessel. We have seen a row of candles in an open trough all extinguished by pouring carbonic acid gas into the upper end of the trough. We have no doubt that the carbonic acid was the principal cause of death to the strugglers in the Black Hole at Calcutta.—EDS.

Boring for Oil near Chicago.

MESSRS. EDITORS:—As Dr. Stevens, in a recent article in your paper, alluded to appearances of oil in the stone of which the Second Presbyterian Church in this city is constructed, it may prove of interest to your readers to detail some of the facts connected with the boring of a well near the quarry from which this stone was taken. This well is now in the process of being bored, and has reached a depth of 620 feet. In and about Chicago, except at the point of boring, the alluvial soil is about 100 feet in depth. At this place, however, an upheaval or natural convulsion has thrown about 100 acres of rock to and above the surface of the surrounding prairie. This point adjoins the city limits of Chicago, and is only about two miles from the center of the city. The formation is the Upper Silurian. The surface rock, 35 feet in depth, is a dark fosiliferous limestone, thoroughly saturated with petroleum. Immediately beneath this is a stratum of what we call Athens marble. It is a coarse-grained, yellowish-white limestone, an excellent building material, out of which many of our first buildings are erected. This stratum is 100 feet in depth, and is varied by occasional bands of perfectly white marble. All through the surface rock plenty of oil was found. The Athens marble being exceedingly hard and compact, no oil was found in it. Underlying this stratum we penetrated a band of conglomerate rock, flint and limestone, very hard, interspersed with thin layers of iron pyrites and one trace of copper. This was 100 feet in thickness, and whenever crevices appeared in the rock strong indications of oil were found. Beneath this conglomerate we entered the shale which separates the Upper and Lower Silurians. This band here is 156 feet thick, characterized by no special peculiarities. We met with nothing but a few bushels of nodules of more perfectly-formed shale, which occasionally dropped into the well, but this entire band was saturated with petroleum; the sediment came up like putty—thick and greasy; a test by distillation afforded a small quantity of oil, and naptha in abundance. Gas now began to escape, and signs of oil were abundant. After this the drill penetrated the upper surface of the Galena limestone, and where this shale rests upon the underlying rock, at a depth of 527 feet, the largest quantity of oil yet seen was found. The drill and drill rods were covered so thickly that the oil ran from them in considerable quantities; these signs were highly encouraging. At 539 feet the first sandstone was entered, and here again oil was visible in amounts sufficient to produce satisfaction. This sandstone is 71 feet thick, and shows oil throughout the entire stratum, but whenever there appears a seam or crevice, or where two layers of different kinds of rock come together, leaving a crack or opening between the two, the signs are far more abundant and favorable. At 608 feet another band of limestone containing flint and sulphurets of iron was struck. It is very hard, and progress through it is slow. It is in this rock that the drill is now at work at a depth of 620 feet. At the present writing this well is in constant commotion from the action of escaping gases;

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it boils and roars and surges; the water at times is forced to the surface, and then suddenly falls, 30 and 60 feet. The water usually standing in the well is about five feet from the surface of the ground. From the number of seams containing oil which have already been passed through, from the quantity obtained, and from the escape of gases, I have no manner of doubt that now a pump could be inserted in this well, and oil enough obtained to make it pay expenses.

G. A. Shufeldt, Jr.

Hermetic Barrels.

Messrs. Editors:—There is a description of a hermetic barrel on page 288, current volume of the Scientific American. There is also a reference to said barrel on page 292. Barrels intended to contain refined oil and spirits, are invariably glued on the inside, and, in most cases, painted on the outside. This is a hermetical package, but owing to shrinkage of the wood the glue cracks at the joints, and leakage is the consequence. I have known for some time that a perfect hermetical barrel is possible. The impermeability of the wood is accomplished by having the annular layers concentric in the package as they are in the tree. Our present mode of getting out staves is radial with the trunk of the tree, thus cutting the annular rings in lengths equal to the thickness of the staves, thereby exposing the cellulose portion of the wood to the percolation of fluids, that not only pass through the open pores, but dissolve the mucilaginous matters contained in those that are closed. By getting out the staves tangential to the circles of annular growth, the thickness of the staves would admit of quite a number of layers, the capillaries of which could be filled with water and the ends sealed up, thus preventing shrinkage, preventing percolation, and producing, beyond a doubt, an hermetically sealed package. This mode of getting out staves has another advantage. It is well known that old barrels are tighter than new ones, arising from the fact that the gummy matters having been dissolved, the cellular layers collapse under pressure of the hoops, bringing the ligneous layers closer. But what the barrel has gained in "seasoning" it has lost in durability. The wood being saturated with oil becomes as brittle as if it was dazed. By preventing the absorption of oil, the wood will retain its fibrous toughness; and if it be true that the lower ligneous layer must be pressed against the upper ligneous layer, to act as a fulcrum to break it on, we will be less troubled with broken staves, with their leakage and loss.

John Connolly.

Boston, Mass., Nov. 10, 1864.

A Missing Boiler-maker.

Messrs. Editors:—We have at the Union Volunteer Refreshment Saloon a lady refugee, from Richmond, Va., with four children. Her husband was forced into the rebel ranks, but deserted in November, 1863. She left the following April in search of him. All her efforts to find him seem in vain, and she is much distressed in consequence. Our Committee have spared no pains to find his whereabouts, but have not succeeded. It occurred to me while perusing the Scientific American that a communication in your columns might be the most likely means of finding him, if alive, as he is a boiler-maker. His name is Richard Rodd.

By giving this matter a notice in your valuable paper you will serve the cause of humanity. Any communication may be sent to my address, or to our saloon.

John W. Hicks,
No. 713 South Second street, Phila.

Philadelphia, Pa., Nov. 22, 1864.

A Born Machinist.

Henry Maudsley, one of the most eminent of English mechanics (whose death is reported to us among the news brought by the last foreign steamer), had this mechanical instinct strikingly developed. His father was a carpenter, but young Maudsley himself was much fonder of working in iron, and would often excite the anger of the foreman by stealing off to an adjoining smithy. He urged so hard for a change that when fifteen years old, he was transferred from the carpenter's to the blacksmith's shop. Here he became an expert worker in metal, and was soon quite noted for forging "trivers" with great speed and skill, the old experienced hands gathering round to admire him when at this work.

When a boy has the innate love of his trade that Maudsley had, and thousands of American youth all over the country to-day have, he does not remain at the foot of the ladder. Take a boy—there are plenty such—who has no particular predilection for anything, and put him at a trade, and he will always remain a mere workman. But boys like Maudsley, almost without knowing it, are urged on to something better. At this time Brahmah, the lock-maker, had great difficulty to find mechanics skillful enough to make his locks with the neat precision he wanted. Young Maudsley was suggested to him, and, on being sent for, the Woolwich blacksmith came to London.

He was but 18 years old, strong, muscular, tall, and remarkably handsome. But both Brahmah and his foreman thought he was too young to be put in the shop with old workmen. A worn out vise bench was lying near by, and Maudsley seeing that his chances were in danger, asked permission to go right to work and fix it up. He did so, and the job was so splendidly executed that he was at once engaged, and he became as much a favorite in this as in his former shop. He rose in position and became foreman. In 1797 he opened a shop of his own, and he and his wife (for a pretty girl had a little time before accepted the hand of the handsome blacksmith) clearing the hired shop of the dirt and rubbish left in it by a former tenant. His first customer was an artist, who gave an order for the iron frame of a large easel; and thenceforth Maudsley's shop had plenty of work. His next success was the invention of the slide-rest with which his name is usually identified, an invention, too, which all familiar with the use of the turning lathe, now consider indispensable. Maudsley subsequently became a famous manufacturer of machinery; but even when he employed numbers of men, and found it necessary to labor more with the head than the hands, he used to go often to the forge and work enthusiastically with the sledge hammer, just from sheer love of his art. In time his shop became as it were a college of mathematical art, from which the best mechanics were proud to graduate.

The French Grape Harvest.

A traveler who has closely watched the progress of the vintage through France is of opinion that the present will rank among the best years. Such a good result was not expected in the month of August last. At that time the grapes had become hard in some places for want of rain, and in others they were scorched with the extreme heat. Fortunately, in the middle of September, a beneficial rain fell, which brought moisture into the veins of the plant. As the rain was prolonged the fears of the vine-dressers were again roused, and some of them gathered their grapes between two showers. fearing they would be washed away. "Quantity," said they, "is sufficient for us, for nobody can expect good quality this year." Contrary to their prediction, however, the rain ceased on the 22d of September, and an east wind set in with a bright sun. A complete transformation took place in the vineyards. The grapes that were shrivelled became full, and those that were green ripened in 24 hours. Hands were wanting to gather the grapes, and much would have been lost had not the commanders of regiments lent their men to assist the vine-dressers; and it was at that moment that the journeymen coopers struck for higher wages. The traveler was present at the making of the wine in the Medoc, and says the grapes are never pressed, except to make the wine used in the family, after the juice has run into a vat over which the grapes are placed. He describes the magnificent wine cellars at Bordeaux on the Quay des Chartrons, which are galleries lighted with gas, through which one may walk or drive amid 10,000 casks and 500,000 bottles of the best wines in the department. The cellars of the wine-growers are not so extensive, being only formed to receive the produce of two crops. Sometimes it is a marquis or an earl who does the honors to a visitor, but the majority of the wine-growers leave that duty to be performed by their head cellerman, a person who possesses the same faith in his master's wine as he does in his religion, and is as anxious in the care of his casks as he is in that of his children.

Iron Fortifications.

A large number of military and scientific gentlemen recently visited the Millwall Iron Works, London, to view a three-gun wrought-iron shield, completed to the order of the Russian Government, for the defence of Cronstadt. The shield in question is constructed upon the system of fortification patented by Messrs. Hughes and Lancaster. The following are the principal mechanical details of the massive structure:—It is 43 feet 6 inches long by 10 feet in hight, and is composed of wrought iron bars of a size hitherto unattempted in "grooved rolls," 12 inches by 12 inches, rolled with a "rebate," and corresponding hollows on the opposite side, strengthened by dovetailed ribs at their back, 3 inches in thickness, which are attached by keys or wedges in dovetailed holes to upright beams or girders, 14 inches by 14 inches, on each side of the embrasures and at the ends, and in two equal divisions of its length, to four frames or brackets like the letter A, with one vertical side. The foundation plate on which the whole structure stands is 43 feet 6 inches long, 2 feet wide, and 3½ inches thick, rolled in one length. The total weight of the shield is about 140 tuns. Each embrasure is 4 feet from the platform, and 4 feet high. In the throat it is 2 feet 2 inches in width, or, with the shelving of the cheeks, 2 feet 10 inches. The military advantages of such an opening in an iron parapet of 15 inches thickness is that the guns can be worked so as to take a greater sweep of range than is possible where the parapet is of masonry. In point of strength, an inch thickness of iron is equal to one foot thickness of storework, so that the power of a resistance of the shield in question is equivalent to that of a wall 15 feet thick. As a matter of experiment it is to be put upon the parapet of one of the outer ports at Cronstadt, but should it be found to answer the expectations of General Todleben, it will itself take the place of the parapet, the whole metal platform being fastened by clamps and rivets into the granite rampart. The piece of work excited general admiration. The visitors had also the pleasure of seeing a 6-inch plate rolled for the defence of a ship's side. The company is at present executing a large order of them also for the Russian Government.

The Termination of a Great Strike.

English news mentions that the great strike of the colliers in South Staffordshire has terminated in the submission of the workmen to the employers' terms. This was the greatest strike of laborers that probably has ever taken place. It commenced in August last, and before it concluded eighteen thousand laborers were standing idle, and their families, embracing between sixty and seventy thousand persons, were left without support. A reduction of about five dollars upon the market price of a tun of iron reduced correspondingly the cost of material which enters into its manufacture. This lowered the wages of the colliers sixpence per day for one set of laborers and threepence for another, reducing their pay to four shillings sixpence and three shillings threepence per day. The colliers insisted that the whole burden should fall upon the iron workers and not upon them, though the relations of labor are so intimately connected that what affects one touches the other generally in an equal degree. The employers, or "masters" as they are termed in England, showed that they could be undersold in their own markets unless the cost of material was reduced, and their only alternative was either to contract expenses or close up their business and withdraw their capital to other branches of labor. They adopted the first expedient, and as the colliers would not furnish coal to them at the reduced wages, the iron masters closed their places of business, the customers went to other markets, and the whole district of Staffordshire has suffered accordingly. In the meantime invention has been set to work to furnish coal-cutting machines to supersede manual labor, and with every prospect of finding a useful substitute which will cheapen coal to the poor as well as to the iron manufacturer.

An organized attempt to burn the principal hotels in this city failed by the vigilance of the fire department.

The steamer *Francis Skiddy* was sunk on the 28th ult., a few miles below Albany.

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Improved Ratchet Drill.

This ratchet drill is the most novel one we have ever seen. It is self-feeding, and has the details of the ratchet portion arranged in a very ingenious and durable manner. Every mechanic knows what trouble the springs on the pawls usually give; they are forever getting out of order, either breaking or "setting" so that they have to be continually repaired. This wrench has not a single spring employed in its construction. The movements are all positive, and the wrench is much stronger from the absence of delicate screws or other parts to be subjected to a heavy strain.

In Fig. 1 the wrench is shown in perspective, with the feeding arrangement. This detail is merely a clamp, A, falling in a recess on the socket, B, and having its other end sliding over a standing pin, D. When it is desired to work with the wrench, the socket is run down to its place, and the clamp screwed up by the screw, C. When the drill turns so as to cut, all parts move together, and there is no action; but when the drill is stationary, on the back stroke of the handle, the socket is held by the clamp, and screwed out so as to increase the pressure of the drill, and, of course, feed it down. This arrangement can be made to feed fine or coarse by simply making the pin, D, movable over the top of the wrench, at E. In this way it would suit large or small drills, for the latter require finer feed than the former.

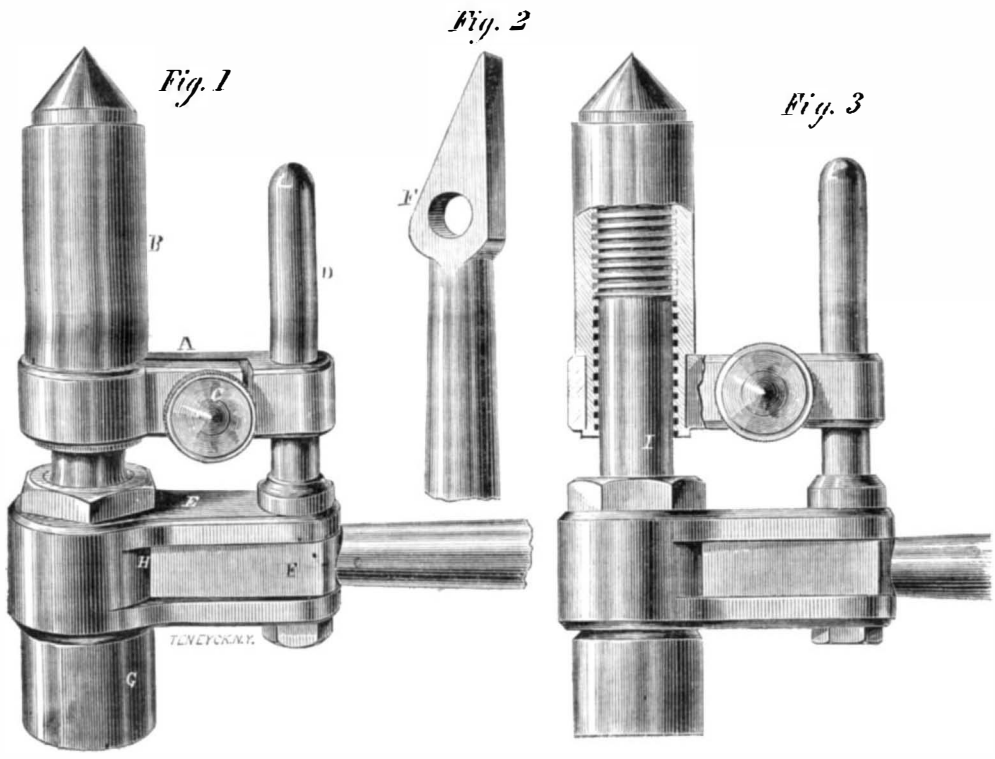
In Fig. 2 the pawl end of the handle is shown. The pawl and handle are all in one piece, and by being movable on the center, F, the pawl naturally pitches into the ratchet on the drill socket, G, inside the case, H. By this action no spring is required, and the pawl is much stronger than common ones.

In Fig. 3 the socket is shown partly in section. The spindle, I, has only a portion of its length cut with a thread, the lower part being turned true, and made to fit the inside diameter of the socket. As a consequence, the drill and wrench always stand straight, and a better hole can be drilled, to say nothing of the mechanical completeness of the arrangement for protecting the screw thread from injury. Sockets and spindles not so made invariably become loose and shaky, so that the drill and wrench stand at all angles.

The thumb screw, C, adjusts the feed at the pleasure of the operator, for, when the friction caused by a maximum pressure upon the screw is greater than that between the clamp and the socket nut, the feed ceases, and only begins again when this pressure is reduced by the cutting of the drill. By this means a perfectly regular feed is kept up, and liability to break tools done away with.

These are the chief features of this excellent tool, but we wish to say one word in favor of its construction. It is made of the very best wrought iron and steel. The drill socket, G, is of cast steel, and it and the spindle are, of course, one piece. The fits are perfect, the threads accurately cut, the cone center of the socket true with the spindle below, and the several parts are as handsomely finished as a prize wrench. It is by far the handsomest tool of the kind that has ever come into this office, and the most efficient one, also. The proprietors inform us that they intend making them better than this in future, and that they are determined to make the best wrench in the market, as they doubtless will. A hole can be drilled much quicker and truer with this wrench, because the feed is always on, and is regular from beginning to end. For running fluted rimmers down in large holes on marine engine work it is a most useful tool.

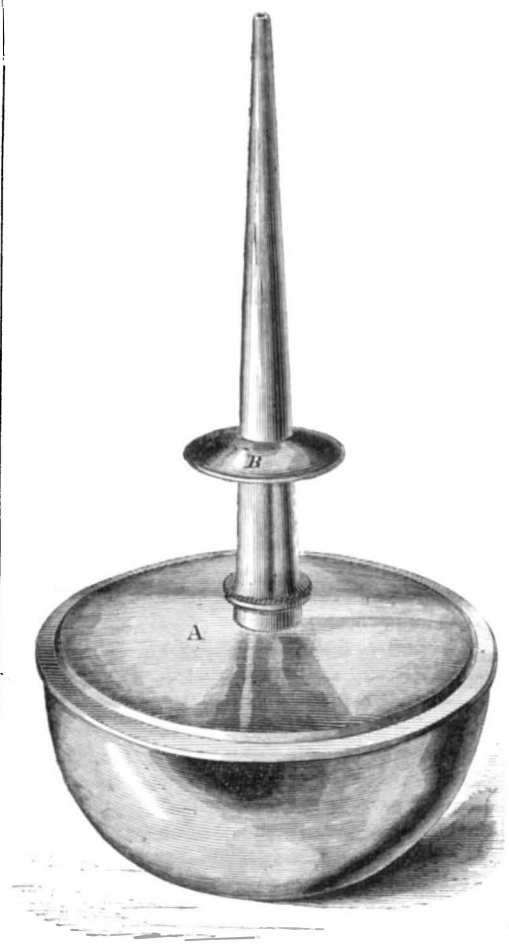
It was patented by L. H. Olmstead, through the Scientific American Patent Agency, March 24, 1863, and is manufactured by Messrs. Davenport & Betts, of Stamford, Conn., to whom all orders must be addressed.



OLMSTEAD'S RATCHET DRILL.

OLMSTEAD'S OIL CAN.

This novel oil can is one of much utility. From its form it is impossible to upset it, so that oil which is wasted from this cause in flat bottomed cans is preserved in the one here shown. It has another advantage, also, which is in the position of the bottom. To use a Hibernicism—the bottom is at the top. The thin metallic part, which is spun up in the lathe, serves as a spring, impinging, when pressure is applied, upon the oil, and forcing it out of the tip. This spring-bottom is brazed in the upper part of the can, at A, and is much more durable than when in the obverse position. When used on metal-planing machines oil cans are often punctured in the bottom by the ends and angles of sharp chips, and in machine shops, generally, they are frequently injured in the way designated.



The body of this can is in one piece, so that there are no seams or joints to become leaky. The washer, B, is fast on the tip, and serves as a shoulder to slip the fingers over so as to spring the top in when oiling. This can was patented Nov. 18th, 1861, by L. H. Olmstead. Manufactured by Davenport & Betts, Stamford, Conn., to whom all orders should be addressed.

Winter Flowering Bulbs.

Henry A. Dreer, florist, of Phila., gives the following method to grow hyacinths and other bulbs in the winter season, in pots and glasses:—

"For this purpose single hyacinths, and such as are designated earliest among the double, are to be preferred. Single hyacinths are generally held in less estimation than double ones; their colors, however, are more vivid, and their bells, though smaller, are more numerous; some of the sorts are exquisitely beautiful; they are preferable for flowering in winter to most of the double ones, as they bloom two or three weeks earlier, and are very sweet-scented. Roman Narcissus, Double Jonquilles, Polyanthus Narcissus, Persian Cyclamens, Double Narcissus Early Tulips and Crocus, also make a fine appearance in the parlor during winter.

"Hyacinths intended for glasses should be placed in them during October and November, the glasses being previously filled with pure water, so that the bottom of the bulb may just touch the water; then place them for the first three or four weeks in a dark closet, box, or cellar, to promote the shooting of the fibers, which should fill the glasses before exposing them to the sun, after which expose them to the light and sun gradually. If kept too light and warm at first, and before there is sufficient fiber, they will rarely flower well. They will blow without any sun, but the colors of the flowers will be inferior. The water should be changed as it becomes impure; draw the roots entirely out of the glasses, rinse off the fibers in clean water, and wash the inside of the glass well. Care should be taken that the water does not freeze, as it would not only burst the glass but cause the fibers to decay. Whether the water is hard or soft, is not a matter of much consequence—soft is preferable—but it must be perfectly clear, to show the fibers to advantage.

"Bulbs intended for blooming in pots during the winter season should be planted during the months of October and November, and be left exposed to the open air until they begin to freeze, and then be placed in the greenhouse or a room where fire is usually made. They will need moderate occasional watering until they begin to grow, when they should have an abundance of air in mild weather, and plenty of water from the saucers, whilst in a growing state; and should be exposed as much as possible to the sun, air, and light, to prevent the leaves from growing too long, or becoming yellow."

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VOL. XI. NO. 23 ....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, DECEMBER 3, 1864.

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EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that since the law of March 4, 1861, went into force, the previous law, in respect to extending patents for seven years, was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention, and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1851 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension; it must be done at the instance of the inventor—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

For full particulars concerning extension, address

MUNN & CO.,

Editors and Proprietors of the SCIENTIFIC AMERICAN,
37 Park Row, New York.

THE "SCIENTIFIC AMERICAN" FOR THE ENSUING YEAR.

On the first day of January next we shall commence Vol. 12 of the New Series of the SCIENTIFIC AMERICAN, and we scarcely need to remind our readers that in the present state of Journalism in this country, things are so much changed by the exigencies of the war, that publishers are compelled to carry burdens almost too heavy for them. These are not imposed by the arbitrary power of Government, but are the general result of circumstances which the wisdom and foresight of our rulers could not control. A free press we have, and must have; but cheapness is a condition absolutely necessary to its growth and development. Nothing short of these two elements can meet the wants and interests of the American mind. That the latter, however, cannot well be expected at the present time, may be seen from a reference to the high prices which obtain for every thing used in a publishing office. Paper that once cost 9½ and 10 cents per lb., is now hard to be obtained at 30 cents per lb. A like advance has been made in all other articles. Many feeble papers have already expired, and many more must experience a like fate, unless by some sudden turn of fortune's wheel they shall be relieved of present pressure.

In spite, however, of these burdens, which we confess to have felt to some extent by a decreased profit for our labor, we have maintained the standard of the SCIENTIFIC AMERICAN equal to that of any previous year. The paper we believe has lost none of its old renown; indeed, if we may trust to the judgment of many of our oldest readers, we may well cherish the conviction that it was never before so well edited. We are conscious, at least, that our labors in this particular have never been more earnestly directed to gratify our readers. The valuable information published in the SCIENTIFIC AMERICAN can not be obtained from any other journal. In the volume now closing the mechanic will find that special attention has been paid to his interests; the manufacturer will observe many hints on workshop economy, new fabrics, systems and schemes, the inventor and patentee will find the fullest and earliest intelligence on all that belongs to his peculiar calling; and the general reader will observe that all the great industrial enterprises, all the newest and best plans for ordnance, torpedoes, small arms, steam engines and telegraphing are noticed and discussed. Articles on the large manufactories have been illustrated also, and described at length.

The SCIENTIFIC AMERICAN has had early intelligence of every rebel iron-clad of note, and also descriptions of our own monitors, and illustrations of the Government ordnance, and experiments on iron-clad targets. The great question of the expansion of steam has again arisen, and is still being tested. The Hecker and Waterman experiments, as well as those of Government, are yet under way; and the partial results of the former have already been published. Illustrated articles on machinists' tools, as well as practical rules and hints, will be found in the approaching volumes. The first volume will open with an article on "Lathe Tools," in which all the newest and most approved forms, as well as the work to which they are adapted, will be lavishly illustrated. The attractions, past and forthcoming, of the SCIENTIFIC AMERICAN, render it indispensable to every workshop, and we intend that it shall be welcome at the fireside.

AMERICAN MACHINE TOOLS.

Not many years ago, when a machinist drilled a hole in fine work for a five-eighth bolt, he made it a sixteeenth larger than the bolt, for good measure. When he wanted the bolt itself, he got out the stocks and dies if they were not lost, and twisted away until it was made. If he required a hole particularly smooth and true, he took a piece of steel to the tool-dresser and had it forged half round, after which he turned it in the lathe a little tapering, so that it would enter, and so that he would have to turn his work over ten or eleven times, and mark it all up in the vise before he could safely say he had made a good job! When these miraculous holes were finished everybody would put their fingers in "to see how smooth they were."

Not many years ago drills cut three-sided holes, and the drill that worked round without twisting off, was put carefully on one side. Lathes that bored tapering holes, largest on the back or front, as the case might be, were regarded as in chronic difficulties; and the metal that could not be bored out by humoring the tool was afterwards taken off with a half-round file.

How far removed the machinist of the present day is from these rude processes let the tools in use answer. The half-round rimmers that looked like clothes pins, are handed over to boiler makers, to whose work they properly belong. The bolts are cut in engine lathes, and the threads, instead of being half stripped and thrust forth naked to the world, are clear, clean, sharp and well defined. The stock and its dies, except for occasional use, are supplanted by "sizers," or else deposed altogether. Experienced mechanics know well enough how to correct faulty drills; and as for the lathes that bore holes not parallel, they must be some of the old-fashioned ones, for those built lately are given to no such defect.

The lathes built at Moodna, Orange county, N. Y., are most excellent ones. They are convenient of access in all parts, made of superior materials, and in the best manner. They are geared for screw cutting, and the driving pinions on the spindle, as well as those for feeding, are of wrought iron. The nuts of one size all fit one wrench, which is sent with the machine, so that in changing gears for cutting threads no screw wrench need be used. The tool post slides in slots in a raised bed, so that it can be moved sideways, and the bed or ways has no V-shaped slides to get bruised or jammed by laying tools down upon them. There are other good features in these lathes which we need not here enumerate. The experience of all mechanics who have used them verifies our statements. We have, at random, selected them from many others as an example of what first class engine lathes for general use should be.

The shapers or universal planing machines, at one time made by the Lowell Machine Shop, are also excellent tools of their class; and in this city Mr. A. M. Freeland makes lathes and planers of superior finish and durability. In fact, the general character of American machine tools has of late years been vastly improved. Manufacturers have learned that the best work gives the best satisfaction, and that a reputation once gained for good tools is an investment that pays. Messrs. William Sellers & Co., of Philadelphia, build tools which are fine examples of modern machine work. Messrs. Bement & Dougherty, of the same city, have of late years built and introduced a machine for cutting key ways for gibs and keys in connecting rods, which is a most useful one, effecting a vast saving of labor and time. Messrs. Sharp & Browne, of Providence, R. I., are noted for the superior workmanship bestowed upon their milling machines; and the Putnam Machine Co., of Fitchburg, Mass., build most excellent machine tools of all descriptions. We cannot, however, enlarge further upon individual firms, for our columns are not extensive enough to make mention of all deserving public notice. Any who are omitted will feel that their claims are reserved for another day,

Where once we drilled a single hole at a time, we now have gang drills which make two, three or four holes at once, either of the same or different sizes, and the saving in time is very great. Where formerly we chipped the nozzles of heavy cylinders and similar parts on surface condensers, we now employ portable planing machines. Five-eighth and a sixteenth holes for five-eighth bolts are heard of no more. Men have learned that it is better to put the work in its proper place, drill the holes in their places, and fit the bolts to them than to pierce the job with holes too big, put in rough bolts, shift the work to the final position, and insert steady pins to keep it fast. The bodies of the bolts are the steady pins, and nuts screwed up almost with the fingers, will hold more than a screw wrench could make them when the bolts were pitched into the holes.

These are not trivial things, but are of vital importance to the endurance of machines, whether tools or engines, and it is gratifying to know that intelligent mechanics recognize the principles here laid down. Let us continue to improve, to make American tools the best in the world, and they will soon be in general demand.

POTATOES IN FAT.

There is a common notion among cooks, that when tallow has been burned, it can be cleaned and made white by dropping into it a few slices of raw potato. If this be true we can form no idea of the process by which the cleaning is effected, and we strongly suspect that the opinion results from one of those errors of observation which are so very common. But that potatoes will prevent fat from being blackened by heat, in some cases, cannot be doubted.

If tallow be heated to a temperature of about 600 degrees, the oxygen and hydrogen will be driven off, and the carbon remain as a black powder which will settle

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to the bottom of the dish. The fat is not burned, in the ordinary sense of the word. Burning is a rapid combination of the substance with oxygen, but in this case there is no new combination, but a decomposition. The fat undergoes destructive distillation.

Now, raw potato contains a large proportion of water; if this water is heated to a temperature of 212°, it is evaporated, and as long as the evaporation is going on, all heat which enters the mass is absorbed and rendered latent in the process of converting the liquid into vapor. Consequently the fat is prevented from reaching the temperature of 600°, at which its destructive distillation takes place.

But after it has been decomposed and the carbon has been precipitated, it is impossible to conceive of any process by which slices of potato would cause the carbon to disappear.

CLASSICAL VS. SCIENTIFIC EDUCATION.

The report of a Parliamentary commission, charged with the investigation of the condition and management of certain schools and colleges, has attracted much attention in England. Among other inquiries, the commission sought to ascertain the comparative value of the classical and the scientific systems of education. For this purpose, some very noted witnesses upon both sides were summoned. The advocates of the Latin and Greek system thought that none but their own disciples were competent to express an opinion upon either side of the subject. In support of this view, the Rev. Mr. Temple, of the celebrated Rugby school, said:—

"The one, (the classical student), is naturally led to the study of man, and to the study, therefore, of what is good for the discipline of the mind; the other, (the scientific student), has not studied man, but things, and it is not his business to know what is good for the discipline of the mind. The study of the philosophy of the question comes properly within the sphere of one man's science, but not properly within the sphere of the other man's science."

Concerning mathematics, which hold a very important position in every college curriculum, Dr. Carpenter, who ranks among the first scientific men of Great Britain, whose writings frequently adorn the pages of the Scientific American, testified:—

"Mathematical training exercises the mind most strenuously in a very narrow groove, so to speak. It starts with axioms which have nothing to do with external phenomena, but which the mind finds in itself; and the whole science of mathematics may be evolved out of the original axioms which the mind finds in itself. * * Now it is the essence of scientific training that the mind finds the object of its study in the external world. It appears to me that a training which leaves out of view the relation of man to external nature is a very defective one, and that the faculties which bring his intelligence into relation with the phenomena of the external world are subjects for education and discipline equally important with the faculties by which he exercises his reason purely upon abstractions. * * I may add, that having given considerable attention to the refuted phenomena of mesmerism, electro-biology, etc., I have had occasion to observe that the *want of scientific habits of mind* is the source of a vast amount of prevalent misconception as to what constitutes adequate proof of the marvels reported by witnesses neither untruthful nor unintelligent as to ordinary matters. I could mention striking incidents of misconception in men of high literary cultivation, or high mathematical attainments; whilst I have met with no one who had undergone the discipline of an adequate course of scientific study, who has not at once recognized the fallacies in such testimony when they have been pointed out to him."

Sir Charles Lyell said:—

"It is a very remarkable fact, that if a scientific book is published, it depends more for its sale on the middle classes of the manufacturing districts than on the rich country gentlemen and the clergy of the agricultural parts of the country. * * I think the present state of things unhealthy and dangerous, particularly so in reference to the teaching in this country by the clergy, and a vast proportion of the university men are going into the church. In order to bring their knowledge more in unison with that of the artisans, it is particularly desirable that a certain portion of science should be taught. * * I feel that there is a dangerous want of sympathy at present between the better informed working class of the manufacturing districts and the clergy. Besides, the principle of limiting education to the languages and the mathematics is a direct injury to many men. A large portion of those who would have shown a strong taste for the sciences are forced into one line, and after they leave their college they neglect branches they have been taught, and so cultivate neither the one nor the other. I have known men quite late in life, who had forgotten all the Latin and Greek which they spent their early years in acquiring, hit upon geology or some other branch, and all at once their energies have been awakened, and you have been astonished to see how they came out. They would have taken that line long before, and done good work in it, had they been taught the elements of it at school. (Mr. Twistleton.)—So there was a mental waste in their youth? Quite so."

A HINT FOR THE HOLIDAYS.

The approaching holidays remind us of the beautiful custom, now almost universal, of gift-giving. One is often puzzled to know what to select. Even when the gift must be humble and inexpensive there is ample room for the exercise of discernment. That is the wisest gift which confers the most lasting benefit on your friend; and the result of such benefit will naturally be continuous remembrance of, and esteem for you. Gentle reader, would you like to make such a present to your friend? Send him the Scientific American for a year, at $3. Its welcome appearance at the close of every week will remind him of your goodness. On every page he will find something of value and interest with which he will insensibly connect your name. Kind parent, would you like to benefit your son, inspire his mind with love for useful things, keep his thoughts from evil, and help him to rise in the world? Give him, for Christmas, the Scientific American for a year. It may save you hundreds of dollars in money and thousands of heartaches.

ALUMINUM BRONZE BEARINGS.

Aluminum bronze is a most excellent composition for boxes or bearings that run at a high speed, such as saw mandrels, fan blowers, etc. There is a small mandrel in Carhart & Needham's melodeon factory which runs 7,000 revolutions per minute; it has aluminum bronze boxes, which are perfectly cold to the touch. Mr. Carhart informed us that he had tried everything before this without success.

Aluminum bronze is made from copper, 90 parts, aluminum, 10 parts, and can be obtained in this city. It was recently advertised in back numbers of this journal. Propeller shafts and boxes troubled with chronic heating might be cured by this metal. Boxes for fan blowers particularly, the shafts of which run from 3,500 to 4,500 revolutions per minute, might be easily lined with this metal. It is pronounced by those who have used it to be a superior composition for all journals at great velocities. Persons who are unaware of its merits will be benefited by remembering these facts.

Machine for Registering Musical Notes.

One Herr Endres, of Mayence, has discovered a machine which will write down music as fast as it is played, thus entirely doing away with the great labor of composing. A German paper thus alludes to it:—

"This machine, the inward organization of which is still a secret, may be adapted, with very little trouble and at small cost, to any new or old keyed instrument, such as the organ, piano, etc., without the slightest injury to the same. Though it is reckoned for any number of octaves, it is also so small in compass that it can be completely concealed under or behind the instrument. Leaving out the question of the mechanism inside, the visible process outside consists in inserting at one end of the machine an endless strip of paper, about two inches broad, which comes out at the other end with red lines ruled on it, and the notes, etc., printed thereon in black. The machine reproduces every note sounded by the keys, be the notes on or between the lines, not only marking their position, as c, d, e, and so on, but their value as conveyed by the usual characters; that is, it prints off the notes as demi-semi-quavers, semi-quavers, crochets, and semibreves; it shows whether they are dotted or not; marks the pauses; the *forte* and the *piano*; points out where the employment of the pedal commences and where it leaves off; and, in a word, reproduces the music so completely that very little is left for the pen to do afterward. Following every wish of the player as willingly as his fingers, the mechanism works in three-four or four-four time (and every other time may be reduced to these), and proceeds quickly or slowly at pleasure. But it does even more: it immediately transposes any piece of music from one key to another. While, however, it enables a composer instantaneously to preserve his musical thoughts and fancies by means of the usual notation, it also gives the power of immediately taking a copy of every piece of music; of writing out from a score the separate parts of instrumental composition; and of exercising a control over learners by showing whether they play correctly, for it marks every fault, and whether they have repeated certain passages so and so many times. Thanks to this invention, a deaf person may see what he has played; the master give his pupil a lesson, without being close to him, and so forth. If this new machine can readily do all, which, to judge by the experiments already made, there is hardly any doubt it can do, it will certainly occasion a revolution in the world of music.

How to Act when the Clothes take Fire.

Three persons out of four would rush right up to the burning individual, and begin to paw with their hands without any definite aim. It is useless to tell the victim to do this or that, or call for water. In fact, it is generally best to say not a word, but seize a blanket from a bed, or a cloak, or any woolen fabric—if none is at hand, take any woolen material—hold the corners as far apart as you can, stretch them out higher than your head, and, running boldly to the person, make a motion of clasping in the arms, most about the shoulders. This instantly smothers the fire and saves the face. The next instant throw the unfortunate person on the floor. This is an additional safety to the face and breath, and any remnant of flame can be put out more leisurely. The next instant, immerse the burnt part in cold water, and all pain will cease with the rapidity of lightning. Next, get some common flour, remove from the water, and cover the burnt parts with an inch thickness of flour, if possible; put the patient to bed, and do all that is possible to soothe until the physician arrives. Let the flour remain until it falls off itself, when a beautiful new skin will be found. Unless the burns are deep, no other application is needed. The dry flour for burns is the most admirable remedy ever proposed, and the information ought to be imparted to all. The principle of its action is that, like the water, it causes instant and perfect relief from pain, by totally excluding the air from the injured parts. Spanish whiting and cold water, of a mushy consistency, are preferred by some. Dredge on the flour until no more will stick, and cover with cotton batting.

Photography.—We have received from John A. Whipple, photographer, No. 96 Washington street, Boston, finely-executed pictures of the brave Lieut. Cushing, who destroyed the rebel ram *Albemarle* in the harbor of Plymouth, N. C. Also of the *Kearsarge*, the war vessel that destroyed the *Alabama* off the harbor of Cherbourg, France. These pictures attest the high skill of Mr. Whipple as one of the best photographic artists in the country.

Back Numbers and Volumes of the "Scientific American."

VOLUMES III., IV., VII., AND X., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. I., II., V., VI. and VIII. are out of print and cannot be supplied.

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RECENT ENGLISH PATENTS.

Some recent English inventions are here appended:—

Rotary Engines.—The cylinder of this improved rotary engine is made in two halves, each of which is turned inside to a template, so as to be exact counterparts of each other, and then the two halves are fixed together with accuracy. In the interior of the cylinder there is a central plate or disk acting as an arm, and forming a central boss, which is fitted conically into glands connected to both sides of the cylinder. The arm extends to the piston part of the cylinder, and works between two rings provided with springs. The piston is fixed to the arm, and works in a circular space or bore at the outer circumference of the cylinder. The box of the arm has an oblong hole, into which is loosely fitted the main shaft of the engine, so that there shall be no friction on the arm and glands. The side is enclosed in a box or case having a stuffing-box, and to the outer end of the slide-rod is connected a roller, which is placed in an elliptic or cam groove, cut or formed in a drum fixed to the main shaft, so that as the drum revolves the slide shall move out to allow the traverse of the piston, and then close up quickly. When there is a double engine having two cylinders, the grooved drum is placed between, and the grooves arranged accordingly. For regulating the supply and exhaust of the cylinder there is a slide valve worked by a loose eccentric on the main shaft, there being stops for working the engine forwards or backwards; and air-pumps, feed-pumps, and other apparatus can be worked by eccentrics on the main shaft or otherwise.

Steam Boilers, etc.—These improvements consist, first, in dispensing entirely with the use of straight or flat plates or bars, in the preparation of hoops or rings, or other continuous forms, thereby avoiding the necessity of any seams or joinings in such hoops or rings or other forms, by which they are very considerably strengthened; and instead of such straight or flat plates or bars the patentee uses ingots or blooms of iron or other materials, from which the hoops, or rings, or other continuous forms are to be made, such ingots or blooms being of comparatively small diameter or sizes, and of considerable thickness, but sufficient in quantities of material to form the hoops or rings, or other forms, of the sizes desired; and, subsequently, by the operations of pressing, hammering, and rolling, or either or any of such operations, from such ingots or blooms into hoops or rings, or other forms as desired, and without any joinings or seams whatever.

RECENT AMERICAN PATENTS.

Pumps for Compressing Air, Etc.—The object of this invention is to compress atmospheric air, vapor or gases and store them in a proper reservoir, which must be of great strength and thickness, for use in oil and other wells, including those called artesian, for the purpose of obtaining a flow of liquid from such wells upon the principle of the oil ejectors. It consists in placing oil, water or saline solutions in the chambers and passages of an air pump, or in other words, immersing the piston of an air pump in a liquid comparatively incompressible in lieu of air, whereby the efficiency of the pump is greatly increased. George M. Mowbray, of Titusville, Pa., is the inventor.

Machine for Cutting Out Gloves.—This invention relates to a new and improved device or machine for cutting out gloves preparatory to sewing the same for market or for use. The invention consists in a peculiar construction and arrangement of the cutters and their attachment to a bed-plate, and also in the manner of connecting the latter to the cross-head of a press, whereby several advantages are obtained over the machines hitherto used for the purpose. Henry J. Dickerson, Groversville, N. Y., is the inventor.

Traction Engine.—The object of this invention is to render the driving mechanism of a traction engine entirely independent of the truck, so that said driving mechanism is free to follow the sinuosities of the ground. The invention consists in the employment or use, in combination with the truck, of a hinged frame, which carries the steam boiler and cylinder and the driving gear, and which forms the bearing for the axle of the driving wheel in such a manner that said driving wheel is free to follow the sinuosities of the ground, and to act with its full power, assisted by the weight of the boiler and driving gear, and independent of the position of the wheels supporting the truck frame. G. W. Barrett, of Urbana, Ohio, is the inventor.

An American Steamer Building for an English Company.

Daniel Westervelt, of this city, is building for the Pacific Steam Navigation Company, of Liverpool, England, a beautiful side-wheel steamer, to be called the *Favorita*, and from present appearances she will probably be the fastest steamer of her length in the world; she is intended to be so at least. The *Favorita* is intended for the route of this company on the west coast of South America, extending to the isthmus down to the lower parts of Chili. As the route is cut up into divisions, it is not known at present what division she will be attached to. Capt. James Hall, one of the company's officers, is here superintending the construction of the vessel.

The *Favorita* is 200 feet in length, 300 feet beam, and 19 feet depth of hold; she is building of the best materials, and will be in every respect a first class passenger and light freight boat. The Atlantic Works are building the engine, which has a 56-inch cylinder and 11 feet stroke, and the power that can be developed will certainly tend, with her fine model, to make her a very fast vessel. No pains or expense will be spared to make her the most attractive, comfortable and staunch vessel on the Pacific coast. All the new improved labor-saving machines will be placed on board, among them will be the Ericsson windlass; this is deemed the best for a vessel which is constantly using her anchors and desires to weigh them quick and with a small crew, as is the case in the Pacific trade, and these vessels are only a few hours at sea when they run in, anchor, land their passengers and freight, up anchor and are off for another port.

The *Favorita* will be superior in many respects to the *Peruvian*, which was built here by Mr. Westervelt in 1860–1. It is gratifying to us as a nation, and creditable to our ship builders that England must come to us to have passenger steamers for the use of her navigation companies in foreign waters. Nothing but American built ships seem to please and satisfy the people of Peru and Chili, who support the Pacific Steam Navigation Company's line. Capt. Hall went to England to have a vessel built there, but none of the builders could guarantee to build such a vessel as would make the speed, possess the accommodations, and come up to the requirements of the superintendent as well as the demand of the patrons of the line. The rapidity with which the work on the *Favorita* progresses gives promise that it will not be many weeks before she will be launched.

Diamonds for Boring Artesian Wells.

Mr. Lorenzo Dow, No. 170 Broadway, N. Y., recently brought to this office a core of compact sandstone, about two feet in length and 3½ inches in diameter, which was taken out on the Funk farm, Pennsylvania, by his peculiar cutter. This instrument was originally patented in France, by M. Rudolph Leschand, and subsequently in the United States, through the Scientific American Patent Agency. The most novel feature in the tool is the employment of diamonds for cutters in the place of steel. These diamonds are set in the end of a tube driven by machinery, the same as an ordinary drill, and work with astonishing rapidity. Five feet per hour is a fair rate of its progress through hard sandstone. The drill leaves a core standing which is broken off and drawn upon convenient lengths. In the cutter under notice, 15 diamonds are used, and the cost of them is about $500, but they last a long time, and are practically durable. Miners and well-borers who have seen it speak highly of its efficiency.

TRUNK hardware is almost entirely an American product, and a distinct branch of the hardware business. It consists of locks, rivets, nails, rollers, silvered, gilt and japanned ornaments of various kinds, bag frames, steel and brass bands, buckles and hinges. One Connecticut establishment furnishes nearly all the locks used in the trade.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING NOVEMBER 22, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

45,128.—Combined Time and Concussion Fuze for Shells.—Clifford Arick, St. Clairsville, Ohio:

I claim, first, The construction of a soft metal fuze case, having an annular chamber or groove for the reception of an annular time fuze, and a vertical or other independent chamber or tube, for the reception of a concussion or percussion fuze.

Second, The union in a single magazine to an annular fuze, of the two ends of the fuze, by independent vents, one operated in the usual way on time, and the other by concussion or percussion.

45,129.—Knob Latch.—John H. Barnes, Brooklyn, N. Y.:

I claim the construction of the latch-head, D, having three bevelled surfaces, substantially as and for the purposes set forth.

I also claim the beveling of the outside ends, g g, of the keeper or striker, E, substantially as and for the purposes set forth.

I also claim the arrangement of the inner inclines, k k, of the keeper or striker, E, substantially as and for the purposes set forth.

I also claim the combination of the beveled latch head, D, and keeper or striker, E, for the purposes set forth.

45,130.—Steam Carriage.—G. W. Barnett, Urbana, Ohio:

I claim the driving wheel, F, steam boiler, H, and cylinders, G, mounted upon the hinged frame, D, in combination with the truck frame, A, all constructed and operating substantially as and for the purposes set forth.

45,131.—Device for Measuring Cloth in the Piece or Roll.—Wm. Beaton, Grinnell, Iowa:

I claim, first, A cloth measure for measuring cloth and other materials, in the roll or folds, substantially as described.

Second, I also claim the hollow bill for inserting the tape in the folds of the goods to be measured in the roll, in combination with the reel of the tape, substantially as described.

[This invention consists in the construction of an implement by means of which cloth and other materials put up in rolls, can be measured in the roll, thereby saving the necessity of opening or unrolling a package or roll in order to measure its contents.]

45,132.—Gate.—Asa Blood, Sr., Janesville, Wis.:

I claim a gate and door when constructed and supported substantially as and for the purpose described.

45,133.—Screw.—Wm. G. A. Bonwill, Dover, Del.:

I claim as a new article of manufacture, a wood screw, constructed as herein specified.

[In these screws longitudinal grooves intersect the threads and extend through the plain part near the head and also into the beveled side of the head. A screw thus constructed may be inserted into a piece of wood without the necessity of previously boring, cuts clean and does not splinter the wood, takes a firmer hold and may be inserted into the most delicate article without splitting it. It is also adapted to countersink itself.]

45,134.—Soldering Furnace.—Lewis Boore, Buffalo, N. Y.:

I claim the relative arrangement and combination of the coal chamber, A, draft opening, F, hearth, E, for the soldering irons and smoke flue, H, as that the air for combustion will enter above and draw down on to the soldering irons, for the purpose and substantially as described.

45,135.—Water Closet Valve.—John Brower, Newark, N. J.:

I claim a water closet valve held to its place by a bar secured by a hemispherical connection and rendered water-tight by means of a V-shaped joint, all substantially as shown and described.

45,136.—Mode of Lubricating Packing of Pistons, etc.—Daniel J. Browne & Cyrus W. Baldwin, Boston, Mass.:

We claim to coat over or infuse into raw hide, leather, paper, and canvas, or cloth, employed for the packing of caloric engines and pumps, as well as the parts of machines subjected to abrasion or wear, with a good adhesive varnish or paint and when said packing and part of machines are partially stiffened or dry, to dust and further coat them over with finely pulverized plumbago, steatite or talc immediately afterwards, rubbing or burnishing them to the desired degree of smoothness or firmness required, substantially as and for the purposes herein described.

Among the advantages claimed by this invention, are durability, protection from abrasion, moisture, and a considerable degree of heat, when applicable to the packing of caloric engines and pumps, as well as to various parts of machines.

45,137.—Cork Screw.—Joseph Linus Clark, Chester, Conn.:

I claim the increased pitch of the thread when used for the purpose herein described, and operating in combination with the pin, P, and catch, K, or their equivalent.

45,138.—Boots, etc.—Frederick Closs, New Haven, Conn.:

I claim sewing (by machinery) the soles to the uppers of boots and shoes, substantially as herein described.

45,139.—Seed Planter.—Aaron Crisman & Michael Whitmer, Sugar Creek, Iowa:

We claim the combination of a hinged lever, G, cross bar, K, rocker shaft, H, short arms, i i, and feed blocks, K K', or their equivalents with the running gear and seed box of a seeding machine for the purpose of effecting and controlling the discharge of seed therefrom, when a regular vibratory movement is imparted to the lever, G, and its attachments by means of an annular plate, a, and pins, b b, operating upon a cam, g, substantially in the manner herein set forth.

45,140.—Safety Fuze.—J. E. Chase & Joseph Toy, Simsburg, Conn.:

I claim enclosing the body of the fuze within a covering of loose fibers in the condition of sliver or its equivalent, substantially as and for the purpose above described.

[This invention consists in covering the body of fuze, in making waterproof safety fuze, with a covering made of fiber when it is in the condition known as "sliver."

45,141.—Soap Composition.—Edwin De Mortimer, Cincinnati, Ohio:

I claim the compound of materials in the proportions and manner and for the purpose set forth

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45,142.—Bolts in Grinding Mills.—Roswell Denison, Grand Rapids, Mich.:

I claim the employment or use of a series of tubes, containing balls or other shaped weights and applied to the bolt, to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved means for knocking or jarring flour bolts during the operation of bolting, in order to favor the passage of the flour through the bolting cloth and prevent the latter from choking or clogging.]

45,143.—Soldering Metal Vessels.—Henry P. Dennis, Peoria, Ill.:

I claim the machine composed of the two-armed standard, A, with the sliding box, C, vibrating box with lever or arm, D, in combination with the shaft, B, the adjustable cylinder or mold and finger lever, E, all constructed and operating substantially as described.

I also claim the cylinder or mold constructed with the head, I, the stave plate, L, with adjustable and set screws, n and K, and springs, P, and stave, q, in combination with the expansion plate, O, and shaft, B, all arranged to operate in the manner and for the purposes set forth.

45,144.—Machine for Amalgamating Gold and Silver.—Julius C. Dickey, Saratoga Springs, N. Y. Antedated Nov. 19, 1864 :

I claim the employment of one or more of the conductors, G, in combination with one or more channels, F, for the purpose set forth.

45,145.—Machine for Cutting out Gloves.—Henry J. Dickerson, Gloversville, N. Y.:

I claim, first, The method of attaching cutters, h j, to the bed-plate, B, as herein shown and described; to wit, by having the cutter, h, secured to ledges, g, and the cutters, j, secured in position by pendant pins or projections, i, and the notched cross-bar, k, and the wedges or keys, l, substantially as herein set forth.

Second, The employment or use in combination with the cutters, h j, of the quirk cutters, n n o, arranged substantially as and for the purpose specified.

Third, In combination with the aforesaid bed-plate, B, and cross-head, f, of a glove-cutting machine, I further claim the dove-tail, S, and slot, t, for securing the bed-plate to the press, substantially as set forth.

45,146.—Folding Chair.—Augustus Eliars, Boston, Mass.:

I claim, first, The arrangement of the pivoted seat supported by suitable braces held by a locking device in such a manner that the chair can be set at any desired inclination, as described.

Second, The arrangement of the locking device and pivoted or hinged legs, operating together as described.

Third, The use of a rigid pivoted ring or bar, to shape the flexible back and also to enable it to be folded into a small compass, arranged substantially as described.

45,147.—Rock Drill.—David Evans, Philadelphia, Pa.:

I claim providing a rock drill with permanent cheeks or cutters a short distance from the point of the drill, to cut or ream the hole drilled of a uniform size, as the point of the drill wears away in drilling.

45,148.—Skate.—Elisha Foote, Saratoga Springs, N. Y.:

I claim, first, The form of the runner as above set forth consisting of a thin upright rib and one or two flanges.

Second, The combination of such a runner with standards to prevent it from turning over sideways, as described.

Third, The use of two screws at the heel, constructed and arranged as described.

Fourth, The improved mode of attaching the clamps and screws, to operate them as set forth.

45,149.—Paper-making Machine.—Eunice N. Foote, Saratoga Springs, N. Y.:

I claim, first, Giving to the pulp on its approach to the cylinder of a paper machine the motion of the cylinder by means of the band of slats described, or other equivalent means for the uses and purposes above set forth.

Second, I claim the combination with the cylinder of an endless band of slats or its equivalent, constructed and operating as and for the purpose described.

Third, I also claim the use of the rolls, b and c, and band, d, or their equivalents to effect the objects specified.

45,150.—Carriage Wheel.—Walter K. Foster, Bangor, Maine :

I claim the combination of the holding screw bolt, g, with the wheel and the tire contracting mechanism thereof.

I also claim the combination of the series of tennons, i i i, with the wheel and the tire-contracting mechanism thereof.

45,151.—Invalid Bedstead.—O. P. Furman, Addison, N. Y.:

I claim the pulley, F, provided with a lever, G, at the rear end of its shaft, which works over a semi-circular notched bar, H, in connection with the cords, E E, attached to the pulley, F, as shown and connected to the pivoted part, C, of the bed bottom, all applied and arranged to operate substantially as and for the purpose specified.

[This invention consists in having the bed-bottom composed of two parts, one being fixed or stationary, and the other arranged so as to be capable of being raised and lowered in a more or less inclined position by means of a pulley and cords, and retained at any point within the scope of its movement by means of a fastening, whereby the patient may, with the greatest facility, be adjusted in a horizontal or a more or less inclined or elevated position, and without disturbing or annoying the patient in the least.]

45,152.—Breech-loading Fire-arm.—Alexander Grillet, Philadelphia, Pa.:

I claim, first, The breech-piece, E, and hammer, H, hung to the pin, F, and combined with the devices herein described or the equivalents to the same, whereby said breech pieces and hammer may be made to operate together or independently of each other, as set forth.

Second, The spring bolt, G, with its spring catch, g′, combined with the breech-piece, substantially in the manner set forth and for the purpose specified.

Third, The breech-piece, its spring bolt, G, the pin, e, attached to the same, and the curved slot, j, in combination with the hammer, H, and its two pins, i and i′.

Fourth, The combination of the breech-piece, E, hammer, H, and the spring, u, or its equivalent, for maintaining the breech-piece in advance of the hammer

Fifth, The arm, J, its projection, p, and curved projection, r, in combination with the pin, t, on the breech-piece, the whole being constructed and arranged substantially as and for the purpose herein set forth.

45,153.—Oil Ejector for Oil Wells.—T. B. Gunning, New York City :

claim, first, The employment or use of a gas tube or gas chamber arranged with the air-pump and oil-tube, substantially as shown, for the purpose of admitting of the gas which escapes from the elevated oil being made subservient in forcing up the oil, as described.

Second, The enlarged portion, F, at the upper part of the oil-tube, B, provided with a flap or door, G, and a valve, I, and having the gas tube, H, communicating with it, and all arranged substantially as and for the purpose specified.

[This invention relates to a new and useful means for ejecting or forcing oil from oil wells, and is an improvement on the atmospheric pump recently employed for that pu pose.]

45,154.—Flax and Hemp Brake.—A. W. Hall, New York City :

I claim the employment or use of a series of beaters provided with openings, c, and operated by pins placed in one or more spiral rows on a cylinder, A, in connection with the slotted bed, B, and a suitable spring or springs, all arranged so that the beaters will work consecutively in pairs and perform the operations of beating or breaking, scutching and feeding simultaneously or at one operation, as set forth.

I also claim the bar, F, when applied to the bed, B, and underneath the beaters, C, substantially as and for the purpose specified.

I further claim the knives or cutters, d, and saws, e, when applied to or used in combination with the beater , C, substantially as and for the purpose herein set forth.

I also claim the openings, c, in the beaters, C, made or arranged as shown with a bottom piece or bar so as to raise the flax or hemp from between the bars, e, and admit of its being fed along by the descent or down stroke of the beaters, as set forth.

[This invention relates to a new and improved machine for operating upon flax or hemp, for the purpose of separating the fiber from the woody portion thereof.]

45,155.—Churn.—Samuel Z. Hall, Camden, N. J.:

I claim the employment in a churn of one or more revolving twisted dashers, arranged at a distance from the axis of revolution, substantially as herein specified.

45,156.—Grape Mill.— Amandus Hemminger, Sandusky, Ohio :

I claim, first, The oscillating separator, J J, employed in connection with the grated concave, A a a′, for removing the stems and skin from the pulp previously to the latter being submitted to the action of a press, substantially as and for the purpose set forth.

Second, I claim the combined arrangement of the ribbed and grooved rolls, C C′, and separator, J J, when employed in connection with the grated concave, A a a′, substantially in the manner described.

44,157.—Odometers.—Austin D. Hoffman, Wayne, Mich.:

I claim, first, The spring or brake, H, employed in the described combination with the worm shaft, E, of an odometer, to regulate its rotation.

Second, I claim the double dial, d d′, and gearing, K L M N, arranged as specified in the described combination with the worm shaft, E, and sprocket wheel, F, of an odometer.

45,158.—Mowing Machine.—M. G. Hubbard, Syracuse, N. Y.:

I claim the combination of a curved track-clearer hinged as and at the point described, and extending forward as and for the purposes set forth, in combination with a curved adjustable grasswing attached in the manner described to the upper edge of the clearer board, substantially as and for the purpose specified.

45,159.—Oscillating Engine.—M. C. Kilgore and Wm. Eberhard, Washington, Iowa :

We claim the combination of the arm, H b, attached to the cylinder, the guide, I, attached to the head, G, of the piston rod, the arc-formed valve seat attached to the underslide of the cylinder and the adjustable arc-formed stationary valve, K K, all constructed, arranged and operating in tho manner and for the purposes herein specified.

45,160.—Composition for Candles.—John Lawrence Klein, New York City:

I claim a new and improved process for making composition candles as herein described, using for that purpose the aforesaid ingredients or composition of matter or any other substantially the same, and which will produce the intended effect.

45,161.—Manufacture of Paraffine Candles.—John Lawrence Klein, New York City:

I claim a new and improved process for making paraffine candles, as herein described, using for that purpose the aforesaid ingredients or compositions of matter or any other substantially the same, and which will produce the intended effect.

45,162.—Gate Fastening.—Henry Last, West Lebanon, Ind.:

I claim the latch, E, provided with a lever, F, applied to the gate, A, substantially as shown, in combination with a drop catch, G, arranged with a spring or springs, in such a manner that said catch may, to a certain extent, yield or give to the latch as the latter impinges against the drops as the gate closes, substantially as and for the purpose set forth.

[This invention relates to a new and improved fastening for gates, and has for its object the ready opening of the gate by an equestrian, without the necessity of dismounting, and at the same time admit of the gate closing and fastening itself, without the liability of the fastening being injured by jars or concussions, however violently the gate may close.]

45,163.—Sap Spout.—John McCombs, Edinburg, Ohio :

I claim a sap spout consisting of the cylinder, A, cone, B, and bore, C D, the whole being constructed and for the purpose herein specified.

45,164.—Apparatus for Marbling Soap. —F. Moreau and F. Roberts, New York City :

I claim the use of two pans, A B, with holes, a b, in their bottoms, and connected by pipes, c, in combination with plates, C E, constructed and operating substantially as and for the purpose set forth.

45,165.—Locking Door for Railroad Cars.—E. W. Morse, Chicago, Ill.:

I claim, first, A locking device in a car or other structure with sliding doors, constructed and operated substantially as above described.

Second, I also claim protecting the bolt of the lock by means of the guides which hold the door to the rail on which it slides, substantially as and for the purpose set forth.

[This invention consists of a device for locking the sliding doors of freight cars, by which the bolt is concealed within the guides which hold the door to the rail on which it moves.]

45,166.—Manufacture of Soap.—F. Moreau and F. Robert, New York City :

We claim the within-described process of manufacturing soap by mixing lye with fat or oil oxydized either previous or during the saponification, substantially in the manner herein set forth.

Also the use in the manufacture of soap of an apparatus, substantially such as herein described, consisting of a flat pan, A, supported by a frame, C, in a steam jacket, B, as set forth.

45,167.—Washing Machine.—S. A. Mort, Dayton, Ohio :

I claim, first, The fitting of the journals of the rollers, F, of the concave in segments, G, connected at their lower parts by a hinge or joints, d, provided with springs, H, and attached to slides, I, which have springs, e, attached to them, in combination with the fluted cylinder, C, placed in an adjustable frame, B, all being arranged to operate in the manner substantially as and for the purpose herein set forth.

Second, In combination with the above I further claim the partitions, J J, placed within the suds-box and arranged relatively with the concave, E, substantially as and for the purpose herein set forth

[This invention relates to a new and improved clothes washing-machine, of that class in which a concave of rollers is used in connection with a fluted cylinder.]

45,168.—Air Pump.—G. M. Mowbray, Titusville, Pa.:

I claim, first, Compressing and forcing air in and through a pump by means of water or other comparatively incompressible liquid, so that the air is acted on directly by the water and does not come in contact with the piston under a mode of operation and by a combination and arrangement of chambers, D D′, and cylinder, A, substantially as above set forth.

Second, I also claim arranging the inlet or check valves so that while air is supplied through their seats to the chambers, D D′, a small portion of water or other liquid may also be passed into the chambers to compensate for the waste of the supply in the pump, substantially as described.

Third, I also claim the combination of the air-reservoir, J, with the water gage, L, and water discharge cock, M, substantially as described.

Fourth, I also claim balancing or partially balancing the inlet or check valves by means of the compensating water supply under a mode of construction and operation, substantially as described.

45,169.—Artificial Leg.—F. W. Newbert, Pittsburgh, Pa.:

I claim the arrangement of the stop, f, and cushioned shoulder, g, in front of the knee joint in combination with the elastic cord, e e′, and cord, d′ d, arranged and operating substantially as herein described and for the purpose set forth.

45,170.—Portable Refreshment Fountain.—Augustus J. Ohmer, Hamilton, Ohio :

I claim, first, The portable refreshment fountain hereinbefore described, consisting of the reservoir, A, ears, C C, injecting and discharging tube, D, throttle, E, and nozzle, G, or their equivalents, constructed, arranged and employed substantially as and for the purposes specified.

Second, In combination with a portable refreshment fountain I further claim the flexible tube, H, and mouth piece, I J K, constructed and employed in the manner and for the purposes described.

45,171.—Vegetable Cutter.—Samuel W. Packard and Charles A. Meekins, Rockland, Mass.:

We claim the arrangement of the rotary conical cutter-head, A, with a series of knives, D, in combination with the hopper, E, constructed and operating as and for the purpose set forth.

45,172.—Washing Machine.—Albert L. Philipp, Appleton, Wis.:

I claim the endless apron, E, in connection with the fluted cylinder, G, rollers, H H, yielding bed, D, and the yielding rollers, C C, all arranged in a suds-box, A, to operate in the manner substantially as and for the purpose specified.

[This invention consists in the employment or use of a fluted cylinder, pressure rollers, an endless apron and yielding bed, all being so arranged and combined that clothes may be washed with great facility and in a perfect and thorough manner.]

45,173.—Carriage Spring.—Charles P. Phillips, Syracuse, N. Y.:

I claim the outside guide lugs, a and b, so arranged as to operate in conjunction with the center bolts of leaf springs, for the purposes and in the manner specified.

45,174.—Device for marking Ground for Planting.—W. W. Potts, Rushville, Ill.:

I claim the long and short axles, A A, in combination with the wheels, F, provided with beveled rims, b, all arranged substantially as and for the purpose described.

I further claim the connecting of the axles, A A, by means of the two parallel reaches, B B, extending beyond the front axle, A, to form hounds to receive the draught pole, C, in connection with the brace rods, D D, all arranged as shown to form a simple, economical and durable framing for a device, for the purpose set forth.

[This invention relates to a new and improved machine for furrowing ground for planting corn, and it consists in the employment or use of wheels provided with beveled rims and attached to axles all being so arranged that ground may be furrowed in a rapid manner and with great accuracy, so as to ensure the corn being planted in check rows.]

45,175.—Grinding Plate.—P. M. Randall, San Francisco, Cal.:

I claim a grinding plate, B, the grinding surface of which is composed of two or more materials of different hardness, the softest material being placed nearest to the center or axis of rotation, and the hardest nearest to the periphery or furthest from the axis of rotation, substantially as and for the purpose herein shown and described.

[This invention consists in the manufacture of grinding plates of two or more materials of different hardness arranged so that the softest material is nearest to the center, and that said plate becomes harder and harder towards its periphery, and consequently the hardness of the material increases with the destructive effect, and the grinding surface is prevented from wearing uneven or coarse.]

45,176.—Cartridge Extractor for Fire-arms.—Henry Reynolds, Springfield, Mass.:

I claim the ejector consisting of a lever, C, and attached wedge, h, applied to the exterior of the frame of a fire-arm and in combination with its chamber or chambers, and operating substantially as herein specified.

45,177.—Cultivators.—J. J. Rider, Wilton Junction, Iowa :

I claim the treadle levers, M M, the adjustable roller, K, and the chains or cords, L L, when so combined with each other, and with the frame of a cultivator plow, as to sustain the weight of the plows and plow beams, and enable them to be quickly and readily elevated from the ground by the driver, substantially in the manner and for the purposes herein set forth.

I also claim the cord, p, pulleys, o o o o, angular lever, W, spring bolt, l, arc-shaped cross beam, S, and sockets, m, m, when combined with each other, and with the frame of a cultivator plow, for the purpose of enabling me to adjust the direction of the draft, substantially in the manner herein set forth.

45,178.—Mold for taking Impressions of Feet.—Jean Eustache Augustine Rillot, San Jose, Cal.:

I claim, First, The separating gauges, B, in combination with the mold, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The adjustable toe gauge, D, applied in combination with the mold, A, substantially as and for the purpose set forth.

Third, The extension, E, in combination with the mold, A, and separating gauges, B, constructed and operating in the manner and for the purpose substantially as specified.

[This invention consists in the application of separating gauges, one to each of the halves of the mold, in such a manner that the impression taken from the foot can be readily separated in two halves, in order to release the foot, and also the last formed by casting thereon lead or other suitable material. The invention consists, also, in the application to the foot from which an impression is to be taken of an adjustable toe gauge, whereby the proper length and width of the last is insured, and the impression taken from the foot, and the last cast in this impression, can be readily made larger or smaller, according to the convenience or desire of the person for whom the last is to be made, or according to the variations of fashion.]

45,179.—Soldering Fire Pot.—Wm. F. Rossman, Hudson N. Y.:

I claim a double clylinder soldering fire pot, or its equivalent having a draft space, D, or flues between the outer and inner cylinder, in combination with the draft holes or perforations, F F F, etc., through the inner one, level or nearly level with the top of the mouth, E, connecting the fire chamber, C, with the space, D, substantially in the manner and for the purpose herein set forth.

45,180.—Concentrated Food.—John H. Schenck, St. Louis, Mo. Ante-dated July 15, 1863 :

I claim the mode of preparing concentrated food, for man and beast, in the manner herein fully set forth and described.

45,181.—Summer Stoves.—Joseph Schmedinghoff, Cincinnati, Ohio :

I claim the combination of the annular plate or ring, C, the shaking handle, G, and the removable basket-grate, E, formed with crenated rim, D d, permitting the passage of air around the margin of the grate, while supporting it within the shell, A.

45,182.—Churns.—Obadiah Seely, Syracuse, N. Y.:

I claim the combination of the vertical adjustable partitions with the lower revolving dashers, f, and the upper revolving dashers, g, substantially as and for the purposes above described.

I also claim the vertical adjustable partition, b, suspended within a churn through its cover, and held against the sides of the churn, substantially as described

[This invention consists in a nove arrangement of an upper and lower series of revolving dashers, with a series of vertical partitions set radially in the churn, by means of which the rotation of the dashers causes the milk to flow in a circuitous course around the sides of the churn, until it comes in contact with the partitions.]

45,183. — Apparatus for Transferring Liquids from Casks.—Daniel Sexton, San Gabriel, Cal.:

First, I claim the faucet, B B′, employed in connection with the rod, D, spigot, G, and pipe, H, substantially in the manner and for the purpose herein set forth.

Second, I claim the nut, I, in combination with the rod, D, when employed in removing a bung, substantially as described.

Third, I claim the employment of the rod, E E′, operating in combination with the nut, I, substantially as described.

Fourth, I claim the use, in connection with the faucet, B, of the boring device, F, when operated as set forth.

Fifth, I claim the annular socket, C, when used to admit of the application of the faucet to the cask, A, and its detachment therefrom, as described.

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45,184.—Field Fence.—F. L. Sexton, Wellington, Ohio:

I claim the special arrangement of rectangular bars, a, stiles, b', posts, b, in combination with the braces, g g, and m m, and pins, p and h, when constructed as and for the purpose set forth.

45,185.—Raking Attachments to Harvesters.—Wm. T. Shaw and John Manz, Wilmington, Del.:

First, I claim the extensive tumbling shaft, I I, attached directly to the main driving shaft, a, in combination with the gearing, G H, and independently hinged rakes, K K, arranged and operating as and for the purposes herein specified.

Second, I claim the revolving head, H H', made in two disconnected parts, adapted to be coupled and uncoupled by means of the key, h', and recess, h2, so as to cause the rakes to operate when the machine is moving forward, and to remain at rest during the backward movement thereof.

Third, I claim the frame or casing, F, formed with the guide, f f', for controlling the movement of the rakes and reels, as described.

Fourth, In combination with the aforesaid guide, f f', I claim the roller, L, arranged and operating substantially as described, to initiate and assist in the elevation of the rake and reel arms, as and for the object specified.

45,186.—Harvesting Machines.—Jonathan B. Smith, Windfield, N. Y.:

First, I claim the cam lever, a, when constructed and arranged to operate in combination with the rods, C, and finger bar, B, in the manner and for the purpose set forth.

Second, I claim the stop, i, applied to the cam lever a, substantially as and for the purpose set forth.

45,187.—Forge Hammer.—Edward Spaulding, Worcester, Mass.:

I claim the blocks I I, with their inclined adjacent faces, when arranged in respect to each other to the anvil, H, and to the hammer, E, to which a reciprocating movement, unvarying in extent, is imparted, and when operated substantially as and for the purpose specified.

45,188.—Mode of Extracting Gold and Silver from Ores, by means of the Vapor of Mercury.—Robert Spencer, New York City:

I claim, First, Subjecting ores, while under pressure and in a disintegrated state, to the action of the fumes or vapors of mercury, substantially as and for the purpose herein described.

Second, Desulphurating and also exposing ores to the action of the fumes of mercury, in a single chamber, substantially as described.

45,189.—Weather Strip.—Stephen G. Spicer, Philadelphia, Pa.:

I claim the combination of the three strips, g h i, hinges j, and flat spring, s, the latter applied to the outer end of the weather strip, g, and all arranged in the manner herein shown and described, to operate in combination with a recess T, in the rabbet of the door frame.

45,190.—Feed Manger.—C. E. Steller, McGregor, Iowa:

I claim, in combination with the hopper or feed receptacle, B, and manger, A, a valve, C, or its equivalent, for the purpose or regulating a supply of food to the manger, as set forth.

[This invention consists in providing a feed manger with a hopper or feed receptacle, which communicates with the manger, and is provided with a valve arranged in such a manner that the manger will be supplied with feed as rapidly only as the animal can eat it, thereby preventing the waste of feed which now occurs with the ordinary mangers, in consequence of the animal throwing it out of the manger by the movement of his head, and also preventing the feed being damaged and rendered useless by slobber, etc., etc.]

45,191.—Water Wheels.—Amos Stewart, Mt. Lebanon, N. Y.:

I claim the serpentine buckets, b, having a concave surface, e, at their outer ends, and a convex portion, e', from the concave surfaces, e, to the hub of the wheel; in combination with the two water discharge passages, E E, placed at opposite sides of the box, A, and the gate, F, connected by the bar, I, which is to be controlled by the governor

[This invention relates to the peculiar form or shape of the buckets, and to a particular manner of applying the water to the wheel, whereby the journals of the wheel shaft are not subjected to any lateral pressure, and much friction thereby avoided, and the admission of the water to the wheel alluded to be regulated by a governor, so as to enable the wheel to operate evenly or uniformly, with a greater or less power, as may desired.]

45,192.—Corn Planter.—Volcott D. Stoddard, Muscatine, Iowa:

I claim the armed wheel, C, in combination with the runners, B, elbow lever, D, lever, F, movable pin, e, and seed slide, F, all constructed and operating in the manner and for the purpose herein shown and described.

45,193.—Abdominal Supporters.—Harriet H. Thompson, Washington, D. C.:

I claim the back brace, A, abdominal supporter, H, cushion, K, with their adjustable and yielding straps, C E, and J, when constructed, arranged and combined as herein described, and for the purposes set forth.

45,194.—Churn Dashers.—Howard Tilden, Philadelphia, Pa.:

I claim the combination and arrangement of the perforated disk, B, with the perforated dash bottom, A, substantially as described, and for the purposes set forth.

Also the arrangement of the wings, C C, in the manner and to act as set forth.

45,195.—Paper-Ruling Machines.—Chauncey Walton, Washington, D. C.:

First, I claim the springs or bar, L, operating, as herein set forth, to gradually elevate the fountain as the same is depleted, so as to maintain an unvarying level of the ink.

Second, I claim the adjustable weight, D2, or its equivalent, employed in combination with the shaft, D D D D', operating to balance the fountain and equalize the power applied to hold the pens in working position, substantially as described.

Third, I claim the combination of the arm, K, and adjustable support, k, fitted to turn on a vertical pivot, to serve as a pen rest, or retain the clamp, C, in any desired position.

Fourth, I claim the siphon cloths, I I', tapering or converging from their central portion toward their respective ends, in the manner and for the purpose herein shown and described.

Fifth, I claim the pen, N N n n, constructed substantially in the manner and for the purpose herein set forth.

Sixth, In combination with the pens, N N' n n, I claim the rods or wires, m m' m2, arranged and operating substantially as described.

Seventh, I claim a ruling pen constructed with two, three, or more points, set at any distance asunder by a screw, n3.

Eighth, I claim the treble pen, substantially as represented, with a right and left screw for adjusting the outer points simultaneously and equally.

Ninth, I claim the bar, m', applied and operating as described, as an additional support for the pens.

Tenth, I claim the bar, M, employed to depress or raise any desired number of the pens at will, as explained.

Eleventh, I claim a ruling pen, constructed with an extensible point, substantially as described.

Twelfth, I claim the sponge S, employed in the manner described, as an ink holder and filter.

45,196.—Pruning Shears.—George F. Walters, Walterville, Maine:

I claim a pair of pruning shears, composed of a fixed chisel-shaped cutter, C, and a curved knife, D, applied to the plate of the cutter, C, constructed substantially as shown, so as to operate with a curved, drawing cut, as described.

45,197.—Grain Shovel.—George V. Watson, George Milsom, and Henry Spendelow, Buffalo, N. Y.;

I claim, First, making a scraper or shovel having a jointed or hinged entering piece, for the purpose and substantially as described,

Second, Placing and operating two, three, or more scrapers on one chain or line, and imparting to said scraper a short vibrating motion, so that one scraper will deliver its load to the one next in advance of it, and so on, until the end scraper delivers to the elevating leg, substantially as described.

Third, Arranging two or more scrapers in line, so as to have a clear space between them, so as to allow the grain to flow in between them and into their track, as set forth.

Fourth, Connecting these scrapers, thus arranged, by stiff bars, D, on each side, jointed and hinged to the scrapers, so as to allow of a free movement upon the joints, and yet keep the scrapers an equal distance apart, and so that if power is applied to the forward scrapers only, it will be communicated through these stiff bars to each scraper in the line.

Fifth Arranging and operating the scrapers in the four quarters of the vessel simultaneously, for the purpose and substantially as described.

Sixth, Imparting to the scrapers a vibratory motion, whereby the scrapers shall be caused to scrape the grain to the elevating leg, for the purposes and substantially as herein described.

45,198.—Sheep Shears.—Herman Wendt and Henry Seymour, of Elizabeth, N. J.:

We claim as a new article of manufacture the sheep shears hereinbefore described, consisting of the backs, A, and blanks, B B, swaged in one piece, the iron blade plates, C C, straps a a, and steel blade plates, D D, all constructed and combined in the manner and for the purposes specified.

[This is an ingenious improvement in the mode of constructing the shear, by which an important economy is secured which enables the manufacturers to furnish an article equally as good as the best heretofore known, at a less cost. Agriculturists will be benefited by this invention.]

45,199.—Steam Engines.—S. Lloyd Wiegand, of Philadelphia, Pa. Ante-dated Nov. 9, 1864:

I claim, first closing the induction valves by a positive movement of a cam, which, while it is adjusted and controlled in position by a centrifugal regulator, is locked or secured during the closing movement of the valve, so as to prevent the resistance of the valve gearing from reacting upon the governor, substantially in the manner set forth and described.

Second, Combining a centrifugal regulator whose plan of motion is coincident with or parallel to the plane of motion of the adjustable cam with the said cam used for operating the induction valves, substantially in the manner set forth and described.

Third, The arrangement of rock shaft in combination with the mechanism for imparting motion thereto, substantially as hereinbefore set forth and described for operating the valves of steam or pneumatic engines.

Fourth, Suspending the oscillating cylinder upon a universal joint, substantially as set forth and described.

Fifth, Combining the centrifugal regulator with the fly wheel in the manner set forth and described.

45,200.—Ambulance Carriages.—Thomas Wilkins, of Greenville, Ill.:

I claim, first, an ambulance carriage having its front and rear axles, A B, connected by an elastic bottom board, C, with a frame E, resting on a crossbar, D, attached to C, with springs, F F', steel or wood, interposed between them, the front part of the bottom board being hollowed out to admit of the cramping of the front wheels, and all arranged substantially as herein set forth.

Second, The litters, L, composed of frames, M, with cloth, k, attached, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved ambulance carriage for carrying the wounded from the field of battle to the hospital or place designated for their subsequent treatment.]

45,201.—Pipe for Gas, Water, &c.—Arcalous Wyckoff, of Elmira, N. Y.:

I claim the combination of a composition of hard boiled tar and sawdust with wooden pipes applied in the manner and for the purpose set forth.

[This invention consists in the application or use of a composition of sand or sawdust and hard-boiled tar, in combination with wooden pipes, in such a manner that by coating said pipes on the inside and outside with the composition the wood is rendered perfectly impervious to water or gas, and preserved against the injurious influence of moisture from the inside or outside.]

45,202.—Breech-loading Firearms.—Alexander J. Bergen and David Williamson (assignors to the Moore's Patent Firearms Company), of Brooklyn, N. Y.:

We claim, first, the spring catches, 7 7, in combination with the sliding breech block, d, and grooved housing, b, substantially as specified, whereby the said springs both guide the breech block and draw out the cartridge case as set forth.

Second, We claim the shoulders, 4 4, within the housing, b, extending below the sliding breech block, d, from the rear end of the barrel to the forward end of the vertically sliding block, e, for the purposes, and as set forth.

Third, We claim forming the tumbler of the hammer with a notch taking against the stop pin, 9, at the extreme movement of the hammer in both directions as set forth, in combination with the removable block, g, whereby opportunity is afforded for the introduction of both the tumbler and stop pin as set forth.

45,203.—Water Alarm Gauges.—John D. Hall (assignor to himself and Osborn Conrad), of Philadelphia, Pa.:

I claim the arrangement of the float, G, the lever, D, the valve, C, and steam whistle, A, substantially in the manner and for the purpose specified.

45,204.—Locomotive Smoke Stacks.—Seth Ham, of Philadelphia, Pa., assignor to himself and Wm. H. McCafferty, of Alexandria, Va.:

I claim, first, the curved deflecting plate, E, and inner journal shaped casing, D, arranged in respect to the inside pipe, A, and outer casing, B, substantially as and for the purpose specified.

Second, The plate, E, inner casing, D, and plate, C, with its flange, a, arranged in respect to each other and the inner pipe and outer casing substantially as set forth for the purposes described.

45,205.—Automatic Air-Holder for Gas Apparatus.—Hugh L. McAvoy (assignor to himself and Elias S. Hutchinson), of Baltimore, Md.:

First, I claim an air-holder automatically charged and discharged by an eduction syphon and an induction pipe, operated substantially as herein described.

Second, I claim the syphon, E, having a valve, E1, which is operated by the arm, E2, and projections, b1 b2, for the purpose of opening and closing the syphon, substantially in the manner and for the purpose herein set forth.

Third, I claim the pipe or tube, F, adapted to be opened to the external air by the withdrawal of the water by the syphon, E, and to supply air to the holder, B, as explained.

Fourth, I claim the induction pipe, G, and valve, G1, the latter being provided with an arm, G2, which is moved by the float, G3, so as to open and close the valve, G1, substantially as and for the purpose specified.

45,206.—Apparatus for Carburetting Air.—Hugh L. McAvoy (assignor to himself and Elias S. Hutchinson), of Baltimore, Md.:

I claim the combination of the inverted bowl or open-mouthed chamber, E, with the air discharging pipe, B, beneath it, substantially as and for the purpose described

45,207.—Low-Water Detector for Steam Boilers.—Bernard Schaffer, of Buckau, Magdeburg, Prussia, assignor to himself and Christian Budenberg, of New York City:

I claim, first, the employment or use of the ball-shaped valve, C, in combination with the adjustable float, D, and whistle, A, as described, leaving the valve free to accommodate itself to the motions of the float, and preventing the valve from sticking by the motions of the float.

Second, The arrangement of the tube r, and set screws, s s, in combination with the float, D, and valve stem, C', as specified, whereby the float can be adjusted to the desired position, and a free communication between the interior of the float and the steam space of the boiler is effected.

45,208.—Looms for Weaving Hats, etc.—Phineas L. Slayton (assignor to Almet Reed), of New York, N. Y.:

I claim giving the weft pressing devices of a circular or rotary loom a movement toward and from the center of the loom during each of the revolutions of the loom, substantially as and for the purpose herein specified

And I further claim the attachment of the plate, R, to the sleeve or its equivalent, by means of a ball and socket, or other flexible joint of similar character, substantially as and for the purpose here in specified.

45,209.—Horse-Hair Woven Garments.—Phineas L. Slayton (assignor to Almet Reed), of New York City:

I claim as an art-improved article of manufacture a garment composed wholly or in part of horse hair, woven in one piece, substantially as herein set forth and described.

45,210.—Priming Metallic Cartridges.—Charles E. Sneider (assignor to himself and Thos. Poultney), of Baltimore, Md.:

First, I claim a cartridge consisting of a casing, A, a transverse pin, B, fixed in the said casing, and an aperture, a2, in the casing opposite the end of the pin B, for the application of a percussion cap, C, to the end of the pin through the side of the casing, as here in explained.

Second, I claim the movable cap or cover, D, employed in combination with the aforesaid casing, A, to close the aperture, a2, and check the escape of gas.

45,211.—Cancelled.

45,212.—Composition for Coating Ships' Bottoms.—Frederick Newton Gisborne, of London, England. Patented in England Oct. 30, 1863.

I claim as my invention the composition substantially as hereinbefore described.

45,213.—Centrifugal Crushing Mills.—C. H. Griffin, of Chelsea, Mass.

I claim combining with the projectors or impelling arms of a centrifugal crushing or pulverizing machine a series of rotating teeth or percussion surfaces, rotating in the opposite direction, substantially as set forth.

I also claim the employment of the pipe, Z, in combination with the receiver and pulverizer, substantially as described.

RE-ISSUES.

1,823.—Stoves.—Dennis G. Littlefield, of Albany, N. Y.—Patented Jan. 24, 1854; re-issued Nov. 19, 1861; again re-issued Aug. 26, 1862; again re-issued May 19, 1863.

I claim the arrangement, adaptation and combination with a fuel-supplying stove of a cover so hinged to the top plate of the stove that it may be swung open on a horizontal plane, substantially in the manner and for the purposes specified.

1,824.—Harvesters.—David S. McNamara, of Troy, N. Y.—Patented June 30, 1857.

I claim, first, the combination of a pointed or hinged lever and caster wheel, with the drooping end of the main frame and finger beam of a harvester when arranged in relation to said main frame and finger beam, substantially as and for the purpose set forth.

Second, The combination of lever, I, frame, A, and caster wheel and leading wheel, substantially as and for the purposes set forth.

Third, An adjustable leading and supporting wheel in combination with the shoe part of the main frame which supports the heel of the finger beam in a mowing machine, when arranged so as to run directly in advance of the heel end of the finger beam and cutter bar and the bearing part of the shoe, and when the axis of said wheel is rigidly connected with the main frame, substantially in the manner and for the purposes herein set forth.

Fourth, The combination and relative arrangement of frame, A, finger beam, G, lever, I, caster wheel, J, and leading wheel, M, substantially as shown and described,

Fifth, The combination and arrangement of the main frame, finger beam, shoe, part F of the main frame and crank shaft, substantially as and for the purposes set forth.

Sixth, Connecting the shaft, t, by means of the arm and link with the rod placed at the underside of the draft pole, and connected with the yoke ring, substantially as described for the purposes set forth

1,825.—Machine for Cutting Paper for Paper Twine, &c.—John B. Wortendyke, of Godwinville, N. J.—Patented Sept. 13, 1864.

I claim, first, the two rollers, C C, in combination with the cylinders, B B, arranged relatively with each other to operate in the manner substantially as and for the purposes herein set forth.

Second, The employment in combination with cutting devices for cutting paper into strips, of separate sets of receiving or take-up rollers, for receiving or taking away the cut strips from the said cutting devices, whereby the strips are separated from and prevented from interfering with each other, in a manner substantially as herein described.

Third, In combination with the cutting devices for cutting the paper into strips I claim the securing of the receiving or take-up rollers, which take the strips of paper from the cutters to their respective shafts by means of friction devices, for the purpose of allowing the several rollers to have separate or independent movements. substantially as set forth.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, dur-

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ing the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,
WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
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The Patent Laws, enacted by Congress on the 2d of March, 1861, now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

W. E. C., of Conn.—It is quite possible that your shaft does not get oil on the bottom. Many shafts heat from this cause If it is collar bound or too tight between the collars, it will heat. File the sides of the brass away 3 inches from the top, so that they clear. If all these plans are of no avail change the brass. Replace it with a harder one and you will have no trouble. A journal that is too small and has a heavy strain on top is very apt to heat the bottom brass unless oil grooves are cut in the same. We should regard the arrangement of the boiler mentioned as undesirable. The temperature of the heat passing over the top of the boiler may not be high but it must be enough to superheat the steam within, which is itself a source of deterioration to the iron.

C. B. M., of Ohio.—Five sided rimmers cut better than square ones, because there are no two edges opposite each other, one edge being always backed up by two others.

B. J. R., of Conn.—Try aluminum bronze in your hot bearing. We have known mandrels run 7,000 revolutions per minute with this composition, and remain perfectly cool when all others failed. Aluminum can be had of metal dealers in all the large cities. To make it, use copper 90, aluminum 10 parts.

C. D. S., of Wis.—The focus of a concave mirror is the point where the rays emanating from it converge.

J. B. of Conn.—Tempered steel at 32° according to Walaston and Lavoisier, expands at 212°, 1 in 926, in length, and 1 in 309, in bulk.

B. J. R., of U. S. N.—The engines of the new sloops-of-war are steeple engines placed horizontally. You need not go out of your own ship to see a steeple engine.

S. C. H., of Conn.—The tendency of superheated steam is to corrode the parts with which it comes in contact. Bourne states that felt applied to boilers has been known to materially increase the corrosion, and he accounts for this fact by its preventing radiation; consequently increasing the steam heat within the boiler.

A. S. A., of Maine.—We are unable to publish your views on boiler explosions. They take a narrow view of the subject. The area of the safety valve is not the only thing, as you say, that requires consideration. A boiler would explode if it had fifty safety valves, all in a row, from the dome to the smoke stack, unless properly taken care of.

T. B. H., of R. I.—There is no danger of your bursting the crank by shrinking it on, unless you allow too much shrinkage. For a 12-inch shaft allow a sixty-fourth of an inch. You must not heat the crank so hot as to raise a scale on it. Expedition must be used in getting it to its place, for we have known cranks stick fast when half home and have to be broken off. All caused by carelessness.

C. P., of Cal.—Your communication is received, and, notwithstanding its formidable length, is under consideration.

M. R., of Mo.—We are much obliged for your receipts but shall give them a trial before we publish them.

D. L. W., of Mich.—There is but one self-propelling steam engine in this city, the J. G. Storm, and it is seldom used except for great fires.

T. T., of Vt.—If, as you state, your cylinder is oval when taken out of the lathe although it was true before its removal, you must have sprung it in bolting it down. When the bolts were taken off it assumed its distorted shape. The fastenings on every cylinder should be eased up before the last cut.

C. H. W., of N. Y.—The number of square feet of heating surface necessary to evaporate a cubic foot of water in a marine boiler is from eleven to fifteen.

R. S. T., of Cuba.—The weight of your fly-wheel rim can be found by multiplying the mean diameter in feet by the area of its transverse section in square inches and multiply this product by 9.817 pounds.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Nov. 16, 1864, to Wednesday, Nov. 23, 1864:—

W. W. S., of N. Y., $100; J. & S., of Conn., $41; E. S., of N. Y., $35; C. L. L., of Pa., $16; L. S., of Pa., $15; G. K. W., of Conn., $12; T. H. S., of N. Y., $15; A. W., of Maine, $16; M. H., of Mass., $16; G. C., of N. Y., $25; J. & S., of Conn., $25; S. S. G., of Ohio, $15; S. G., of Pa., $25; W. A. D., of N. Y., $17; J. W. N., of Mass., $81; A. B., of N. Y., $20; J. T., of N. J., $20; J. J. G., of Ohio, $15; E. & S., of N. Y., $45; T. G. O., of N. Y., $15; H. S., of Iowa, $45; D. M. M., of Vt., $20; T. G., of N. Y., $20; J. & J. M., of N. Y., $15; J. G., of Mich., $15; J. J. S., of Conn., $15; A. & B., of Maine, $20; A. E., of Ohio, $25; G. L. S., of Mass., $10; J. B. T., of Pa., $30; G. C. P., of N. Y., $15; L. C. W., of N. Y., $15; C. L. B., of Conn., $25; S. & H., of Conn., $45; W. & S., of Pa., $15; S. G., of N. Y., $25; W. B., of N. Y., $15; T. R T., of N. Y., $222; T. D. R., of N. Y., $45; J. C., of N. Y., $20; S. L. F., of Pa., $30; H. E. G., of N. Y., $15; McK. & W., of Wis., $20; C. M. M., of N. J., $20; G. W. R., of Ill., $20; C. E. R. of N. Y., $15; A. R., of Iowa, $35; J. L. H., of N. Y., $15; A. Y. McD., of Iowa, $28; I. A., of N. Y., $16; H. H. H., of ——, $20; W. R. T., of Pa., $16; S. W. F., of Mass., $32; S. T., of Ky., $25; J. L. T., of Maine, $15; C. C., of N. Y., $15; A. T. F., of N. Y., $30; A. M., of Ark., $75; T. L., of Conn., $15; H. H., of Conn., $25; E. B. L., of Conn., $15; N. S., of Ohio, $15; J. M., of N. Y., $45; S. T., of Ill., $20; P. H., of N. Y., $20; G. F. I C., of N. J., $40; F. F. C., of N. Y., $22; J. K., of N. Y., $15; J. P., of Canada, $20; H. J., of N. Y., $15; T B. T., of N. Y., $15; J. S., of N. Y., $40.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Nov. 16, 1864, to Wednesday, Nov. 23, 1864:—

W. B. C., of R. I.; M. J. S., of N. Y.; T. A. H., of N. Y.; E. & S., of N. Y., (2 cases); S. E. H., of Conn.; S. T. S., of Ky.; M. B. & N. A. P., of Tenn.; C. L. B., of Conn.; S. G., of Pa.; J. T. P., of N. Y.; J. S., of N. Y.; S. L. F., of Pa.; F. F. C., of N. Y.; A. Y. McD., of La. A. E., of Ohio; S. & H., of Mass.; G. C., of N. Y.; J. & S., of Conn. H. H., of Conn.; J. W. N., of Mass. (2 cases); G. F. I. C, of N. J.; T. G., of N. Y.; O. E. R., of Maine; R. K., of Ill.; E. R., of Mich.; A. T. F., of N. Y.; D. & O., of France; S. G., of N. Y.; J. Y., of N. Y.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

ARMY SUPPLIES.

OFFICE OF ARMY CLOTHING AND EQUIPAGE,
No. 502 Broadway, New York, Nov. 23d, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this office until 12 o'clock M., on Tuesday the 29th instant, for baling Army Blankets, until the 1st of May next, the Contractor to furnish all materials necessary to bale the blankets in a satisfactory manner to this department. The services to be performed in the buildings of this Depot, the Contractor to supply the machinery.

Further information can be obtained at this office. Bidders will state the number of bales they can put up per week, and send with their proposals a proper guarantee signed by two responsible persons, stating that if a contract is awarded to the bidder, they will enter into bonds for the faithful performance of the work.

The United States reserves the right to reject all bids deemed objectionable.

Proposals should be endorsed "Proposals for Baling Blankets," and addressed to

1 COL. D. H. VINTON, D. Q. M. Gen. U.S.A.

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$950—FOR SALE A COMPLETE AND MOST perfect Trip Hammer, on Hughes's Patent Atmospheric principle, worth $950, and will be sold for $500. It is made entirely of wrought and cast iron, occupies very little room, strikes light and heavy blows, at the will of the operator, and runs by belt. Inquire of D. A. MORRIS, Rockaway, N. J.

"A GOOD NUMBER."—VARIETIES OF HUMAN Character, illustrated—Faces in Profile—Grades of Intelligence—Scenes in a Mad House, with likenesses—Intellectual Culture—Woman's Sphere—Choice of Pursuits—Self-Defense—To Young Men—Improvement of Idiots.

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A RARE CHANCE.—FOR SALE AT YOUR OWN price, the entire patents of my Wind-wheel and Governor, illustrated in No. 1, Vol. XI., new series, of the SCIENTIFIC AMERICAN. The inventor having other business which requires his whole attention, will sell the above patents on the most liberal terms. The Governor works equally well attached to any kind of machinery where a Governor is required. It is especially adapted to Water-wheels, it being very sensitive and giving a strong and positive movement. Copies of the illustration furnished on application. Address JOHN P. BURNHAM, Chicago, Ill. 21 3*

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Trial of an English Broadside Iron-clad.

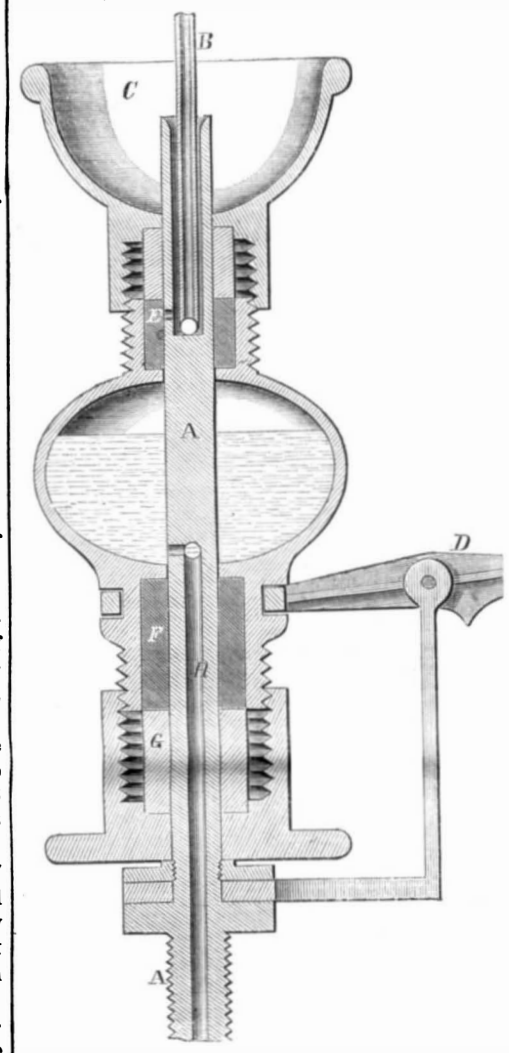
The *Achilles*, a formidable iron-clad ship, has recently been completed in England, and we here present an account of her trial at sea:—

"This was her first trip at sea, and being one of an entirely new class of ships of large dimensions, 6,121 tuns, and carrying four masts, her performance was watched with considerable interest. The results of the trip were not entirely satisfactory, but this refers chiefly to the difference of speed at the contractor's trial and in the Channel. The officers speak well of her sea-going qualities, and all on board are hopeful that the cause of the loss of speed under steam will be found out and remedied. On the 21st, by plunging during a severe gale, the *Achilles* carried away her jibboom and her whiskers (two stout spars projecting at right angles from either bow). She also took in several heavy seas at the bow ports, and it was in consequence determined to run in for Torbay. Here she arrived on Saturday, the 22d, and dropped her starboard anchor, but having drifted with her full broadside to the wind, the chain, fifty fathoms of which were out, broke, and recourse was then had to the port anchor. The vessel, however, was kept under steam all the time she continued in the roadstead. On Monday the lost chain was fished up. On Tuesday morning, the 25th, in weighing the port anchor with the steam capstan, it snapped off near the junction of the shaft with the flues, both of which were left below. On Thursday the *Achilles* was placed in the south basin of Keyham steamyard, where the new 'hog' for scouring the bottoms of iron ships was tested, under the superintendence of Mr. Robinson, from the Admiralty, Whitehall, by the help of the ship's diver. This hog is an enormous brush of birchbroom, about five feet long by three feet broad. Its back consists of a frame of wood 16 inches thick, having round the edge a groove, into which is inserted a rope with iron thimbles attached to each of its four sides, to receive the guides by which the hog is moved under water. Some shellfish were brought up, but the hog could not detach those which were on and near the 'lands,' or projecting strokes of the *Achilles*. The ship measures 380 feet from stem to stern, or 392 feet over all. Her draught aft was 26 feet 3 inches; the depth of water in the dock was 28 feet. Her engines are of 1,250-horse power nominal, and at the contractor's trial were worked up to 5,067 horses; in the Channel 3,200 horse power only could be attained, the pressure of steam being occasionally 26 pound, and the revolutions 40 per minute, against 46 on the trial. The speed first attained, and which at the time gave great satisfaction, was 14½ knots, but during the passage to Plymouth, although an especial effort was used on one occasion, very little over ten knots was produced. Scotch and Welsh coals mixed were used. The trim of the ship, her greater immersion, and the foulness of the bottom may account for a loss of from two to three knots, but what remains puzzles all concerned. At the contractor's trial the ship was 15 inches by the stern; her immersion now is 2 feet more, and she has about 30,000 superficial feet under water. Soon after leaving the Nore it was discovered that she was too much by the head, some of her weights were moved aft, and the coal in the fore bunkers was reduced as speedily as possible. The armament on her main deck is 16 100-pounder smooth-bore Armstrongs, weighing 6½ tuns each, and on the upper deck four 110-pounders. On the passage, when going ahead, the screw revolved 73,500 times; when backing and performing other evolutions not accounted for, it is calculated that the revolutions were 26,500, making a total of 100,000. The screw is considered very powerful. It was occasionally out of water to a small extent, but the 'rest' was not great, because the screw is provided with four blades. The *Achilles* dipped very quickly. In a fresh gale there is little motion; but she did not answer so well in a rolling sea. The crew of the *Achilles*, all told, would be about 755 men. Out of 75 men engaged in the engineer's department 64 only were effective in the stokehole. During the hight of the gale, 27 stokers were unfit for work at one time, chiefly through sickness, occasioned by her liveliness."

THE sales of tobacco for the past year at Louisville, the largest tobacco mart in the world, were 63,322 hhds., the proceeds of which amounted to $20,000,000.

FOGLE'S OIL CUP.

This oil cup is constructed on an unusual and novel principle, and has no cocks or valves about it to become leaky. By the provision of two apertures, merely, the oil is let into the cylinder or valve chest. The following description will render it intelligible to every one. The whole cup, globe and all, slides up and down on the pipe, A. This pipe has the top chambered out to receive a smaller pipe, B, which lets the air or steam out of the interior of the globe. The cup, C, is filled with oil, and when in its present position, the oil runs into the tube, A .The handle of the lever, D, is then raised, the cup following it.



This brings the upper holes, E, into communication with the interior of the globe, while the lower apertures are shut off from the steam-chest by the interposition of the partition, F, and the stuffing box, G. When the globe is restored to its lowest position the oil in the globe runs into the cylinder through the hole, H, because there is as much pressure in one vessel as in the other. This is a very neat and useful cup, and was patented through the Scientific American Patent Agency on Sept. 20, 1864, by Jacob Fogle, of Putnam, Ohio; for further information address him as above.

A "Tricky" Box.

A war correspondent thus speaks of a novel box which was constructed by rebel prisoners confined at the North:—

"One piece of workmanship, of queer device, I shall have occasion to remember. It was a block of polished wood, carved to represent a book. Upon one edge was a small incision fitting the thumb nail, and indicating the existence of a slide and the hollow nature of the contrivance. But he who opened it was pretty certain to receive a surprise. As the slide was withdrawn, a serpent's head darted through the opening, and his forked tongue, in the form of two sharp needles, was violently inserted in the thumb of the operator, who generally hastened to let the curious and keen piercing contrivance fall to the ground as fast as the attraction of gravitation would take it there. It was a machine worthy of the ingenuity of a genuine Yankee, and as such it finally came into the possession of our first officer, who, as a representative of Cape Cod, would naturally look with favor upon such a mischief-making invention."

Economy in the Use of Coal.

With a view to obtain a clear bright fire with the utmost economy in a common stove, an improved fire invigorator has just been introduced by a Mr. Snook, and consists of an improved form of deflector, which is constructed of cast-iron, and occupies the space between the fire-bars. After lighting the fire, and permitting it to burn for about four minutes, with the apparatus closed, so as to form a blower, a large concave elliptical plate, immediately over the bars, and suspended on end pivots, was tilted over to form the deflector. Above this are the necessary shutters for regulating the draught. The heat thrown out is large in comparison to the fuel burned, and the fire has a warm red glow, without flame or smoke. The advantages claimed for the invention are—that fires are lighted without the slightest difficulty; that the whole heat from the fuel is thrown into the room instead of escaping up the chimney; that fifty per cent less fuel is consumed; that there is no smoke, and that nothing but mere ashes are left unburned.—*London Mining Journal.*

TIE your horse in the center of his stall, or he will "drive" more on one rein than the other.

[THE

Scientific American,

FOR 1864!

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